

NUCLEAR  
SUCCESSOR  
STATES

NUCLEAR  
WEAPON  
AND  
SENSITIVE  
EXPORT  
STATUS REPORT

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

SOVIET UNION

BELARUS

RUSSIA

UKRAINE

DTIC QUALITY INSPECTED  
END TECHNICAL INFORMATION CENTER  
BALLISTIC MISSILE DEFENSE ORGANIZATION  
7100 DISTRICT ROAD, RM  
WASHINGTON D.C. 20317-7100

19980309 195

11 5072

NUMBER 1  
MAY 1994

THE CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE  
THE MONTEREY INSTITUTE OF INTERNATIONAL STUDIES



Accession Number: 5072

Publication Date: May 01, 1994

Title: Nuclear Successor States of the Soviet Union, Nuclear Weapon and Sensitive Export Status Report

Corporate Author Or Publisher: Carnegie Endowment for Internatl. Peace/ Monterey Inst. of Internatl.  
Report Number: Number 1

Descriptors, Keywords: Nuclear Successor State Soviet Union Weapon Export Status Report

Pages: 00049

Cataloged Date: Jun 10, 1994

Document Type: HC

Number of Copies In Library: 000001

Record ID: 28901

NUCLEAR  
WEAPON  
AND  
SENSITIVE  
EXPORT  
STATUS REPORT

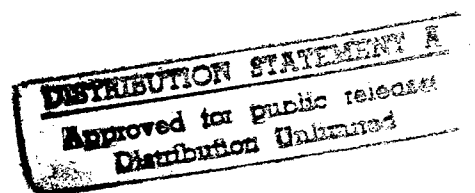
# NUCLEAR SUCCESSOR STATES OF THE SOVIET UNION

A COOPERATIVE PROJECT OF

THE CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE,  
WASHINGTON, DC, AND MOSCOW

NUMBER 1

THE MONTEREY INSTITUTE OF INTERNATIONAL STUDIES,  
MONTEREY CA



DISTRIBUTED IN RUSSIAN BY THE CARNEGIE ENDOWMENT CENTER  
FOR RUSSIAN AND EURASIAN PROGRAMS, MOSCOW

ALSO AVAILABLE IN ENGLISH AS PART OF THE CIS NUCLEAR DATABASE,  
MONTEREY INSTITUTE OF INTERNATIONAL STUDIES

## **Contents**

### **Part I -- Nuclear Status**

Table I-A	Non-Proliferation Profiles . . . . .	1
Table I-B	Declared Nuclear Status . . . . .	2
Table I-C	Nuclear Weapon Systems and Associated Warheads on Territory .	4
	Belarus . . . . .	4
	Kazakhstan . . . . .	5
	Russia . . . . .	6
	Ukraine . . . . .	10
Table I-D	Locations with Separated Weapons-Usable (Fissile) Material Sufficient for One or More Nuclear Weapons . . . . .	12
Table I-E	Russian Nuclear Weapon and Nuclear Power Infrastructure By Administrative Division . . . . .	15
Table I-F	Status of Disarmament Assistance Programs . . . . .	19

### **Part II -- Export Controls and Sensitive Exports**

Table II-A	Most Sensitive Potential Exports (Other Than Complete Nuclear Weapons) . . . . .	22
Table II-B	Status of Export Controls . . . . .	24
Table II-C	Significant Recent Exports . . . . .	28
	Chronology of Reported Illicit Exports for 1993 and First Quarter 1994 . . . . .	29

### **Appendix**

	Maps of Belarus, Kazakhstan, Ukraine, and Russia Showing Key Nuclear Sites .	41
--	--	----

## Preface

The dissolution of the Soviet Union has triggered widespread interest in the disposition of that nation's nuclear arms and related nuclear assets. The status of the nuclear weapons in Belarus, Kazakhstan, and Ukraine, for example, has become a focus of international diplomatic efforts aimed at checking the possible emergence of new nuclear-weapon states. Similarly, ensuring the security of tens of thousands of nuclear weapons and hundreds of tons of weapons-usable nuclear material in Russia has become an area of increasing cooperation between Washington and Moscow. There also have been a number of collaborative initiatives between the United States and the Newly Independent States (NIS) to bolster controls over exports of nuclear goods from the NIS.

Recently, some analysts have voiced concern about possible future political instability in Russia and Ukraine. In both states, unrest could lead to difficulties in maintaining proper control over key nuclear assets or to the emergence of new splinter states with nuclear inheritances.

Events are moving with surprising swiftness. New non-proliferation agreements are being signed; nuclear arms are being transferred from Belarus, Kazakhstan, and Ukraine to Russia; investments are being made in all of these states to accelerate the dismantling of nuclear arms and to ensure the safe and secure storage of the resulting nuclear materials; and export control systems are being established.

To assist those interested in monitoring the rapidly changing nuclear scene in the former Soviet Union, the Carnegie Endowment for International Peace and the Monterey Institute of International Studies have prepared the following report summarizing key developments. We plan to issue the report on a periodic basis. Our two groups will distribute the English version in the United States and internationally, and the report will also be made available through the Monterey Institute's CIS Nuclear Database. The Carnegie Endowment, through its Moscow Center for Russian and Eurasian Programs, will translate the report into Russian and distribute it to officials and analysts in the NIS.

The report has been prepared by Leonard S. Spector, Virginia I. Foran, and Noah M. Sachs of the Carnegie Endowment and by William Potter and Sarah Jacobson of the Monterey Institute. Information compiled by Dunbar Lockwood of the Arms Control Association, Washington, D.C., also contributed substantially to the document.

Valuable comments and information were also provided by an international advisory group composed of:

Valentin Alexandrov	Ministry of Foreign Affairs, Minsk
Alexander Bolsunovsky	Institute of Biophysics, Krasnoyarsk
Oleg Bukharin	Ctr. for Energy and Environmental Studies, Princeton, NJ
Thomas Cochran	Natural Resources Defense Council, Washington D.C.
Andrei Glukhov	Ukrainian State Cmte. for Nuclear and Radiation Safety
Vladimir Orlov	Moscow News
Victor I. Mizin	Ministry of Foreign Affairs, Moscow
Vycheslav Paznyak	Center for Nonproliferation and Export Control, Minsk
Alexander Pikayev	Inst. of World Economy and Intl. Relations, Moscow
Anatoly Scherba	Ministry of Foreign Affairs, Kiev
K. Tokaev	Ministry of Foreign Affairs, Almaty
Ihor Tymofeyev	Ministry of Foreign Affairs, Kiev

The authors would like to express their appreciation to all of these colleagues for their important contributions. It is the authors, however, who made the final judgements about the contents of the report and who bear responsibility for it. We must also acknowledge that because of the rapidly changing and sometimes classified nature of the subject matter, it is possible that we have not always achieved the level of accuracy and comprehensiveness to which we have aspired in preparing the report.

We also would like to thank the Carnegie Corporation, the Ford Foundation, the John D. and Catherine T. MacArthur Foundation, the John Merck Fund, the Ploughshares Fund, the Rockefeller Brothers Fund, the U.S. Institute of Peace, the W. Alton Jones Foundation, and the Winston Foundation for their support of our NIS non-proliferation activities.

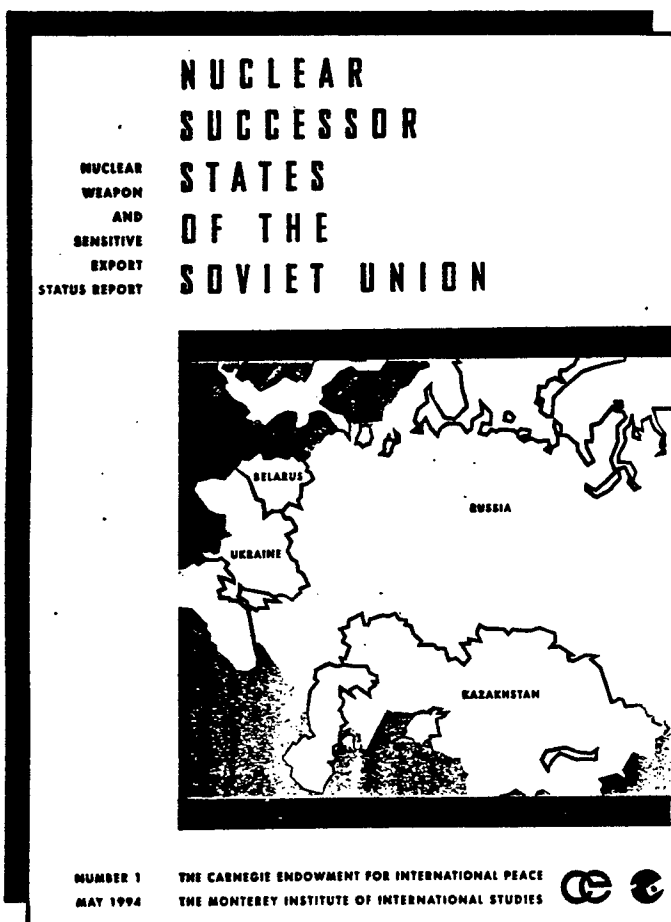
The report contains a number of incomplete entries where the authors were unable to obtain the necessary information because it is classified or otherwise not available. In an effort to make the report as comprehensive and timely as possible, the authors encourage readers to contact the Carnegie Endowment for International Peace or the Monterey Institute of International Studies with any new or updated information.

Leonard S. Spector  
Carnegie Endowment for  
International Peace

William C. Potter  
Monterey Institute of  
International Studies

May 1994

## Carnegie Endowment and Monterey Institute Launch Periodic Report on Nuclear Successor States



Leonard S. Spector of the Carnegie Endowment for International Peace and William C. Potter of the Monterey Institute of International Studies announce the publication of the inaugural issue of *Nuclear Successor States of the Soviet Union: Nuclear Weapon and Sensitive Export Status Report*.

Through detailed charts and tables, the report tracks important developments in the nuclear arsenals and export control structures of Belarus, Kazakhstan, Russia, and Ukraine. The publication also includes maps of each country showing key nuclear sites and an extensive chronology of reported illicit exports of nuclear materials from the Commonwealth of Independent States.

Because of the rapidly evolving nature of the subject matter, the report will be periodically updated and distributed world-wide to government officials, researchers, and journalists.

The Carnegie Endowment Center for Russian and Eurasian Programs in Moscow will translate the report into Russian and distribute it in the CIS. The document is also available in English as part of the Monterey Institute's CIS Nuclear Database.

For further information, contact:

Evan Medeiros  
Carnegie Endowment for International Peace  
2400 N Street, NW  
Washington, DC 20037  
Tel 202-862-7953  
Fax 202-862-2610  
Email 71263.111 @ compuserve.com

Program for Nonproliferation Studies  
Monterey Institute of International Studies  
425 Van Buren Street  
Monterey, CA 93940  
Tel 408-647-4154  
Fax 408-647-3519  
Email MIISCRES @ pandora.sf.ca.us

## PART I -- NUCLEAR STATUS

**Table I-A. Non-Proliferation Profiles**

	BELARUS	KAZAKHSTAN	RUSSIA	UKRAINE
Non-Proliferation Treaty (NPT)	X	X	X	
IAEA Safeguards Agreement	a	a	X	b
Nuclear Suppliers Group (NSG)			X	
NPT Nuclear Exporters (Zangger) Committee			X	
Missile Technology Control Regime (MTCR)			c	d
START I	X	X	e	X (f)
Lisbon Protocol	X	X	X	X (f)
Partial Test Ban Treaty (PTBT)	X		X	X
Nuclear Weapons on Territory	X	X	X	X
Nuclear Power Reactors		X	X	X
Nuclear Research Reactors	X	X	X	X
Nuclear Weapons Design			X	
Uranium Enrichment			X	
Spent Fuel Reprocessing			X	
Nuclear Research Center	X	g	X	X
Nuclear Test Site		g	X	

a: Belarus and Kazakhstan are negotiating NPT-type safeguards agreements with the IAEA.

b: Ukraine is negotiating with the IAEA a comprehensive safeguards agreement independent from the NPT.

c: Russia has modeled its missile export guidelines after those of the MTCR and has pledged to the United States that it will adhere to the terms of the accord. It is not, however, a formal party to the MTCR.

d: In a Memorandum of Understanding signed in Washington on May 13, 1994, Ukraine agreed to conduct its missile and space related exports according to the criteria and standards of the MTCR. It is not, however, a formal party to the MTCR.

e: Russia conditioned its ratification of the START I Treaty on the adherence of Belarus, Kazakhstan, and Ukraine to the START I Treaty and the NPT. Belarus and Kazakhstan have fulfilled these requirements. Ukraine has ratified the START I Treaty but has yet to accede to the NPT.

f: On February 3, 1994, the Ukrainian parliament approved the START I Treaty and the Lisbon Protocol for ratification. However, some Ukrainian parliamentarians have claimed that the Treaty does not require complete denuclearization. The parliament is expected to act on NPT accession shortly.

g: A Soviet nuclear test site was located in Kazakhstan at Semipalatinsk. The site was closed in 1991. Kazakhstan is prohibited by the NPT from conducting nuclear tests and has announced plans to convert the site to a nuclear research center.



**Table I-B. Declared Nuclear Status**

COUNTRY	DECLARED STATUS	START I/START II STATUS	IAEA INSPECTIONS STATUS
<b>BELARUS</b>	On July 22, 1993, Belarus became a non-nuclear-weapon-state party to the Non-Proliferation Treaty (NPT); it is currently transferring nuclear weapons remaining on its soil to Russia; Belarus recognizes Russia's jurisdiction over remaining nuclear weapons on its territory.	Ratified START I, February 3, 1993.  (START II is a bilateral U.S.-Russian treaty that does not call for the participation of Belarus.)	Belarus is negotiating a full-scope safeguards agreement with the IAEA which would provide IAEA inspection of all Belarusian nuclear activities (nuclear weapons still on Belarusian territory are excluded).
<b>KAZAKHSTAN</b>	On February 14, 1994, Kazakhstan became a non-nuclear-weapon state party to the NPT; it will soon transfer nuclear weapons remaining on its soil to Russia <sup>1</sup> ; it is not asserting ownership or control over remaining weapons.	Ratified START I, July 2, 1992.  (START II is a bilateral U.S.-Russian treaty that does not call for the participation of Kazakhstan.)	Kazakhstan is negotiating a full-scope safeguards agreement with the IAEA which would provide IAEA inspection of all Kazakh nuclear activities (nuclear weapons still on territory are excluded).
<b>RUSSIA</b>	De jure nuclear-weapon state; recognized as a nuclear-weapon state party to the NPT.	Russian parliament approved START I with conditions for ratification, November 4, 1992. Among other conditions, the Russian government is prohibited from exchanging instruments of ratification of START I until after Belarus, Kazakhstan, and Ukraine have acceded to the NPT as non-nuclear-weapon states.  The Russian parliament has not yet considered START II, pending resolution of its START I ratification conditions. There is considerable opposition to START II among Russian parliamentarians.	Russia is permitting IAEA inspection of selected civilian nuclear facilities pursuant to a "voluntary offer" to allow such monitoring, as codified in a 1985 agreement between the Soviet Union and the IAEA. <sup>2</sup>

<sup>1</sup> According to reports on Russian Independent TV, on April 28, 1994, and in *Segodnya* on April 28, 1994, an agreement on nuclear weapons in Kazakhstan was reached at the March 28, 1994, summit between Boris Yeltsin and Nursultan Nazarbayev. Reportedly, all warheads will be transferred to Russia within fourteen months and all missile silos in Kazakhstan will be dismantled within three years. The press reports provided no information regarding Russian compensation to Kazakhstan for the fissile material in the warheads (see *Radio Free Europe/Radio Liberty Daily Report*, May 4, 1994).

<sup>2</sup> Under the NPT, Russia is prohibited from exporting nuclear equipment or material to any non-nuclear-weapon state unless the transferred items are subject to IAEA safeguards in the recipient state. Since Kazakhstan and Ukraine have not yet concluded safeguards agreements with the IAEA, continuing Russian exports of low-enriched uranium and fabricated nuclear fuel to these states constitute an infringement of this NPT requirement.

In 1992, the Nuclear Suppliers Group, of which Russia is a member, agreed to withhold nuclear exports from states having any nuclear facilities not subject to IAEA safeguards. However, recognizing the unusual circumstances of the break-up of the Soviet Union, the Group agreed that the rule would not be applied to ongoing supply commitments, such as those between Russia and a number of former Soviet republics.

Table I-B. -- Declared Nuclear Status, con't.

COUNTRY	DECLARED STATUS	START I/START II STATUS	IAEA INSPECTIONS STATUS
UKRAINE	<p>On January 14, 1994, the presidents of Ukraine, Russia, and the United States signed a Trilateral Statement obligating Ukraine to eliminate all nuclear weapons on its territory within seven years after the START Treaty enters into force;<sup>3</sup> Ukraine has begun transferring its warheads to Russia, and 200 warheads are to be transferred by mid-November 1994. On February 3, 1994, the Ukrainian parliament approved the START I Treaty and the Lisbon Protocol, reversing its earlier repudiation of Article V of the Lisbon Protocol, which obligates Ukraine to accede to the NPT. The parliament is expected to consider accession to the NPT shortly.<sup>4</sup></p> <p>Ukraine has claimed ownership of the nuclear weapons on its territory and of their components and is exercising "administrative control" over these weapons; it has not asserted "operational control" over their use, however, other than the right to veto such use. Ukraine may exercise physical control over some of the strategic bombers on its territory.</p>	<p>Ukrainian parliament unconditionally approved START I for ratification on February 3, 1994.</p> <p>(START II is a bilateral U.S.-Russian treaty that does not call for the participation of Ukraine.)</p>	<p>Although Ukraine has not yet acceded to the NPT, it is negotiating a "full-scope" safeguards agreement with the IAEA (similar to agreements between the IAEA and NPT members) which would provide IAEA inspections of all Ukrainian nuclear activities (nuclear weapons still on territory are excluded). The IAEA Board of Governors is expected to discuss details of the agreement at its June 1994 meeting.</p>

<sup>3</sup> Although seven years was the publicly-stated timetable for the transfer of the warheads, a confidential side-agreement to the Trilateral Statement, signed by Russia and Ukraine, is believed to obligate Ukraine to transfer its warheads within three years.

<sup>4</sup> President Kravchuk has proposed a draft resolution of accession to the NPT which declares that the NPT does not cover the "unique situation" of Ukraine, that the presence of nuclear weapons on its territory until "eliminated entirely" does not contravene Articles I and II of the Treaty, and that violation of Ukraine's "territorial integrity or inviolability of Ukraine's borders on the part of any nuclear state" will be viewed as a violation of the NPT (see "Sends Letter on NPT," *Uniar*, January 25, 1994, translated in FBIS-SOV-94-017, January 26, 1994, pp. 28-29).

**Table I-C. Nuclear Weapon Systems and Associated Warheads on Territory<sup>1</sup>**

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
BELARUS	Total 54/54	Total 54/54		
SS-25 ICBM <sup>2</sup>	54/54	54/54	Lida (27/___) Mozyr (27/___)	Fifty-four SS-25s were declared to be on Belarusian territory in the START I MOU, but twenty-seven additional SS-25s were subsequently deployed. <sup>3</sup>  Belarus has begun transferring its SS-25s to Russia. The process is expected to be completed by the middle of 1996. Twenty-seven SS-25s had been transferred by the end of April, 1994. <sup>4</sup>  All SS-25s in Belarus are under formal Russian jurisdiction and control.
Strategic warheads in storage	N/A	___/___		

<sup>1</sup> The baseline figures for Table I-C are taken from the START I Memorandum of Understanding (MOU). Current as of September 1990, the MOU is an annex to the START I Treaty which details the numbers and locations of the strategic offensive forces of the United States and the Soviet Union.

<sup>2</sup> Throughout Table I-C, only ICBMs carrying warheads are counted toward current numbers. ICBMs which have had their warheads removed but which remain in silos are not counted, nor are ICBMs in storage or at conversion/elimination facilities.

<sup>3</sup> *Radio Free Europe/Radio Liberty Daily Report*, December 23, 1993, quoting a spokesman from the Belarusian defense ministry. See also *Arms Control Association Fact Sheet*, January 1994.

<sup>4</sup> Assistant Secretary of Defense Ashton Carter, testifying before the Senate Armed Services Committee, April 28, 1994. See also *Radio Free Europe/Radio Liberty Daily Report*, January 17, 1994, and December 23, 1993. A recent official publication states that only nine SS-25s had been transferred (see *Strategic Missiles Being Removed from Belarus*, Embassy of the Republic of Belarus, March 21, 1994).

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
KAZAKHSTAN	Total 474/462	Total 1410/1290		
SS-18 ICBM	104/92	1040/920	Derzhavinsk (52/___) Zhangiz-Tobe (52/___)	Twelve SS-18 missiles have been sent to Russia for dismantlement, but their warheads remain in storage in Kazakhstan. <sup>5</sup>  According to Russian press reports, all nuclear warheads in Kazakhstan will be transferred to Russia by mid-1995 and all missile silos will be dismantled by mid-1997. <sup>6</sup> Nuclear weapons in Kazakhstan are under Russian control.
Air-Launched Cruise Missiles (ALCMs) <sup>7</sup>	370/0	370/0	Semipalatinsk (370/0)	All strategic bombers in Kazakhstan have been moved to Russia. <sup>8</sup> Associated ALCMs are believed to be in storage at Semipalatinsk.
Strategic warheads in storage	N/A	___/app. 490	likely site is Semipalatinsk	Approximately 370 ALCMs <sup>9</sup> and 120 SS-18 warheads are believed to be in storage.  One undetonated nuclear explosive device is buried at the Semipalatinsk nuclear test site. <sup>10</sup>

<sup>5</sup> *Radio Free Europe/Radio Liberty Daily Report*, February 14, 1994; "U.S. Reward Sought for Ceding A-Arms," *Washington Post*, February 14, 1994, p. A17.

<sup>6</sup> *Radio Free Europe/Radio Liberty Daily Report*, May 4, 1994. See Table I-B, footnote 1, for further details.

<sup>7</sup> Throughout Table I-C, only ALCMs or gravity bombs which can be delivered by strategic bombers on the territory discussed are counted toward "current" numbers. Because all strategic bombers have been removed from Kazakhstan, the table shows no deliverable ALCMs. There may be some ALCMs or gravity bombs in excess of the total carrying capacity of strategic bombers in Russia or Ukraine, but their numbers are unknown.

<sup>8</sup> *Radio Free Europe/Radio Liberty Daily Report*, February 23, 1994.

<sup>9</sup> The START MOU lists 370 ALCMs in Kazakhstan. The Monterey Institute of International Studies and the Carnegie Endowment have received information from a senior Russian official that 240 of these ALCMs were recently transferred to Russia. It has not been possible to obtain published confirmation of this development.

<sup>10</sup> The device was installed in late 1990 or early 1991 for the purpose of calibrating U.S. seismic monitoring stations (interview with senior Kazakhstan official, November 6, 1993). See also "Nuclear Device Still Underground at Semipalatinsk," *Novosti* Newscast, Moscow Teleradiokompaniya Ostankino, quoting the deputy chief of the Semipalatinsk test range, translated in *FBIS-SOV-92-232*, December 2, 1992, p. 22.

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
<b>RUSSIA (STRATEGIC WEAPONS)<sup>11</sup></b>				
<b>ICBMs (Total)</b>	<b>1064/844-1112</b>	<b>4278/4010-4276</b>		
SS-11	326/100-296	326/100-296	Svobodnyy (60/___) Yasnaya (90/___) Drovyanyaya (50/___) Krasnoyarsk (40/___) Bershet (60/___) Teykovo (26/___)	SS-11s are being deactivated. The exact number deployed is unknown.
SS-13	40/40	40/40	Yoshkar-Ola (40/40)	
SS-17	47/40	188/160	Vypolzovo (47/40)	SS-25s from Belarus reportedly are being sent to Vypolzovo to replace SS-17s that are being deactivated. <sup>12</sup>
SS-18	204/app. 198 <sup>13</sup>	2040/app. 1980	Uzhur (64/___) Aleysk (30/___) Kartaly (46/___) Dombrovskiy (64/___)	Twelve SS-18s without their warheads have been transferred to Russia from Kazakhstan, but these have not been re-deployed. Although START I attributes 10 warheads to each SS-18, some may carry fewer. <sup>14</sup>

<sup>11</sup> Information on current numbers of weapons and warheads has been compiled using the following sources: *The Military Balance 1993-1994 op. cit.*; *Jane's Defense Weekly*, March 27, 1993, p. 7; "Lineup of Russian Aerospace Power, 1992," *Air Force Magazine*, July 1993, p. 65; "Nuclear Notebook," *The Bulletin of the Atomic Scientists*, March/April 1994; A. Pikayev and A. Savelyev, "The USSR's Nuclear Might: On Land, At Sea, At Air," *Nezavisimaya Gazeta*, November 2, 1991; A. Arbatov, ed., *Nuclear Weapons and the Republic's Sovereignty*, 1992. Where the above sources disagree, a range estimate is provided.

In testimony before the Senate Armed Services Committee on April 28, 1994, Assistant Secretary of Defense Ashton Carter stated that Russia had removed warheads from roughly one third of its ballistic missiles slated for elimination under START I. The missiles to be eliminated include all SS-11s, SS-13s, SS-17s; about half of the SS-18s; and all SS-N-6s, SS-N-8s, and SS-N-17s. Thus it appears that warheads have been removed from about 330 ballistic missiles in Russia. Since it is unclear exactly which missiles have had their warheads removed, however, the total number of warheads removed is impossible to estimate. The recent published sources listed above thus provide the best unclassified estimate of warhead and missile numbers.

<sup>12</sup> *Izvestiya*, November 13, 1992, p. 1, as cited in "Belarus and Nuclear Weapons," February 2, 1994, *Research Brief from Radio Free Europe/Radio Liberty Research Institute*.

<sup>13</sup> *The Military Balance 1993-1994* lists 198 SS-18s in Russia, but there is no other confirmation.

<sup>14</sup> "Nuclear Notebook," *The Bulletin of the Atomic Scientists*, March/April 1994.

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
RUSSIA--con't.				
SS-19	170/170	1020/1020	Tatishchevo (110/110) Kozel'sk (60/60)	
SS-24	43/46	430/460	Krasnoyarsk (12/___) Tatishchevo (10/___) Bershet (9/___) Kostroma (12/___)	Of the 46 SS-24s, 36 are rail-based and 10 are silo-based. The 36 rail-based SS-24s were removed from alert status under the October 1991 Gorbachev initiative.
SS-25	234/250-320 <sup>15</sup>	234/250-320	Irkutsk (36/___) Kansk (27/___) Novosibirsk (27/___) Yoshkar-Ola (18/___) Nizhniy Tagil (45/___) Yur'ya (45/___) Teykovo (36/___) Vypolzovo (0/27)	The 27 SS-25s which have been transferred to Russia from Belarus are being redeployed at Vypolzovo. <sup>16</sup>
Air-Launched Cruise Missiles and gravity bombs (Total)	176 + /459	176 + /459		
Long-range ALCMs	176/352	176/352	Mozdok (176/352)	Current bomber loadings are based on the START II MOU and more accurately reflect the actual carrying capacity of the bombers. The START I MOU undercounted this capacity.
Gravity bombs and short-range ALCMS	___/107	___/107	Ukrainka (___/107)	Current bomber loadings are based on the START II MOU.

<sup>15</sup> In addition to the 27 SS-25s transferred from Belarus, sources estimate that between 30 and 60 SS-25s have been deployed since the START MOU. 320 SS-25s are listed in "Nuclear Notebook," *The Bulletin of the Atomic Scientists*, March/April 1994. 252 SS-25s are listed in Ralph Hallenbeck and Steve Bauer, "The Former Soviet Union", *Readahead Paper prepared for the ACDA Regional/Nonproliferation Workshop* (McLean, VA: SAIC, April 12, 1994).

<sup>16</sup> "Implications of the START II Treaty for US-Russian Relations," *The Henry L. Stimson Center Report #9*, (Washington, DC: The Henry L. Stimson Center, October 1993).

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
RUSSIA--con't.				
Submarine-Launched Ballistic Missiles (Total) <sup>17</sup>	940/780-864	2804/2640-2728		
SS-N-6	192/64-128 <sup>18</sup>	192/64-128	Pavlovskoye (48/__) Rybachiy (48/__) Yagel'naya (96/__)	Yankee I submarines carrying SS-N-6s are being deactivated.
SS-N-8	280/256-280 <sup>19</sup>	280/256-280	Pavlovskoye (72/__) Ribachiy (36/__) Ostrovnoy (108/__) Yagel'naya (64/__)	
SS-N-17	12/0	12/0	Yagel'naya (12/0)	The only submarine carrying SS-N-17s, a Yankee II submarine, is believed to have been decommissioned. <sup>20</sup>
SS-N-18	224/224	672/672	Rybachiy (144/144) Yagel'naya (48/48) Olenya (32/32)	
SS-N-20	120/120	1200/1200	Nerpich'ya (120/120)	
SS-N-23	112/112	448/448	Olenya (112/112)	
Strategic warheads in storage	N/A	Proportion in storage vs. proportion in dismantlement facilities not known.		Warheads have been removed from approximately one-third of ballistic missiles slated for elimination under START I.
Strategic warheads in dismantlement facilities	N/A		Arzamas-16 Sverdlovsk-45 Zlatoust-36	Russia has told the United States Department of Defense that it is dismantling between 2,000 and 3,000 warheads per year. <sup>21</sup>

<sup>17</sup> Only those SLBMs that are carrying warheads and that are currently loaded or may be quickly loaded onto submarines are counted toward current numbers.

<sup>18</sup> Estimates range from 64 in *The Military Balance* to 128 in *Air Force Magazine*. It is believed that Yankee I submarines carrying SS-N-6s are being decommissioned rapidly. Lower estimates may be more accurate.

<sup>19</sup> Estimates range from 256-280. Most recent estimate cites 256. See "Nuclear Notebook," *op. cit.*

<sup>20</sup> *Military Forces in Transition*, Department of Defense, 1991, p. 36.

<sup>21</sup> Ashton Carter, April 28, 1994, *op. cit.* These figures include the dismantlement of both strategic and tactical nuclear weapons.

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS	WARHEADS	LOCATION (# of weapon systems)	COMMENTS
<b>RUSSIA (TACTICAL WEAPONS)</b>				
Tactical nuclear weapons		Estimates of the total number of warheads on tactical nuclear weapons in Russia range from 10,000 to 25,000. <sup>22</sup>  Proportion deployed vs. proportion held in storage or dismantlement facilities not known.	Tactical nuclear weapons have been withdrawn from submarines and surface ships. Deployment sites for land-based tactical weapons and storage sites for all types of tactical weapons are located throughout Russia.	Approximately 4,000 tactical nuclear weapons were withdrawn to Russia from Belarus, Kazakhstan, and Ukraine. <sup>23</sup>
Tactical warheads in storage	N/A	Proportion deployed vs. proportion held in storage or dismantlement facilities not known.	There are approximately 100 secure storage areas for tactical nuclear weapons in Russia. <sup>24</sup>	
Tactical warheads in dismantlement facilities	N/A	Proportion deployed vs. proportion held in storage or dismantlement facilities not known.	Arzamas-16 Zlatoust-26 Sverdlovsk-44	Russia has told the United States Department of Defense that it is dismantling between 2,000 and 3,000 warheads per year. <sup>25</sup>
Anti-Ballistic Missiles (ABMs)	100	100	ABMs deployed within a 100 km radius of Moscow	

<sup>22</sup> CIA Director James Woolsey, testifying before the Senate Select Committee on Intelligence on January 25, 1994, reported that Russia has approximately 27,000 warheads. Given that approximately 7,500 warheads are on strategic offensive weapons, the remainder are associated with tactical weapons or strategic defensive weapons, or are in storage/dismantlement facilities.

<sup>23</sup> Assistant Secretary of Defense Ashton Carter, testifying before the Senate Armed Services Committee, April 28, 1994.

<sup>24</sup> Gloria Duffy, Deputy Assistant Secretary of Defense for Cooperative Threat Reduction, testifying before the House Foreign Affairs Committee, Subcommittee on Europe and the Middle East, March 24, 1994.

<sup>25</sup> Ashton Carter, *op cit*.



Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
UKRAINE <sup>26</sup>	Total 600/app. 650	Total 1564/ app. 1620		
SS-19 ICBM	130/app. 90	780/app. 540	Khmel'nitskiy (90/___) Pervomaysk (40/___)	Approximately one third of SS-19s have had their warheads removed and have been dismantled. <sup>27</sup>
SS-24 ICBM	46/near 0	460/near 0	Pervomaysk (46/near 0)	Almost all of SS-24s have been deactivated, i.e., warheads removed and stored. Some SS-24s may have been removed from their silos. <sup>28</sup> Warheads are believed to be stored near the base. Under the terms of the Trilateral Statement (see Table I-B), all SS-24s will be deactivated by mid-November 1994.

<sup>26</sup> The number of deployed and stored warheads and missiles in Ukraine will be changing throughout 1994 because of the transfer of warheads to Russia under the terms of the January 14, 1994, Trilateral Statement, the deactivation of missiles, and the removal of some missiles from their silos.

<sup>27</sup> Ukrainian officials quoted in "Ukraine Deactivates Most SS-24 Nuclear Missiles," *Reuters*, May 4, 1994.

<sup>28</sup> Ukrainian Defense Ministry spokesman Anatoly Murakhovsky reported on May 4, 1994 that the deactivation of SS-24s was nearly complete and that "there are only a few SS-24s left to deactivate," (see "Ukraine Deactivates Most SS-24 Nuclear Missiles," *Reuters*, May 4, 1994).

Table I-C. -- N-Weapon Systems and Warheads on Territory, con't.

TYPE	WEAPON SYSTEMS-- START I MOU/ CURRENT	WARHEADS-- START I MOU/ CURRENT	LOCATION (# of weapon systems) START I MOU/ CURRENT	COMMENTS
<b>UKRAINE -- con't.</b>				
Long-range Air-Launched Cruise Missiles (ALCMs)	324/564	324/564	Uzin (168/336) Priluki (156/228)	Nineteen Blackjack bombers (carrying up to twelve ALCMs) are believed to be at Priluki (not thirteen as listed in START I MOU). <sup>29</sup> Twenty-one Bear H bombers (carrying up to sixteen ALCMs) are based at Uzin. <sup>30</sup> All ALCMs believed to be in storage at or near bomber bases.
Gravity bombs and short-range ALCMs	___/0?	___/0?	Uzin (___/0?)	Two bombers at Uzin are in storage. According to one source, the two bombers each carry one gravity bomb. <sup>31</sup> However, a senior Clinton administration official said on January 14, 1994, that Ukraine has no gravity bombs. <sup>32</sup>
Strategic warheads in storage	N/A	___/app. 480	Likely site is Pervomaysk	Approximately 240 SS-19 warheads and 420 SS-24 warheads had been removed from missiles by May 1994. 180 warheads had been sent to Russia under the terms of the Trilateral Statement (see Table I-B) as of May 1994. <sup>33</sup>

<sup>29</sup> *Arms Control Association Fact Sheet, op. cit.*, January 1994. The START I MOU under-counts the number of ALCMs heavy bombers can carry, attributing eight to each bomber. The current numbers more accurately reflect the carrying capacity of the bombers, where a Blackjack can carry up to twelve ALCMs and a Bear H16 can carry up to sixteen.

<sup>30</sup> *ibid.*

<sup>31</sup> *ibid.*

<sup>32</sup> "Background Briefing by Senior Administration Officials; Topic: Documents Signed by Heads of State," *Federal News Service Transcript* (1/14/94:8)

<sup>33</sup> Ukrainian Defense Ministry Sources quoted in "Ukraine Deactivates Most SS-24 Nuclear Missiles," *Reuters*, May 4, 1994. The third batch of 60 warheads was sent to Russia near May 1, 1994.

**Table I-D. Locations with Separated Weapons-Usable (Fissile) Material Sufficient for One or More Nuclear Weapons<sup>1</sup>**

LOCATION	ACTIVITY	PLUTONIUM	WEAPONS-USABLE URANIUM	IAEA SAFEGUARDS STATUS	COMMENTS
<b>BELARUS</b>					
Institute of Power, Engineering Problems, Sosny, Minsk	critical assemblies		fueled with 15-40 kg of Highly Enriched Uranium (HEU)	safeguards agreement not yet concluded	
<b>KAZAKHSTAN</b>					
Semipalatinsk	research reactors		reactors fueled with at least 22 kg of HEU	safeguards agreement not yet concluded	Part of the Baikal-1 and IGR reactor complexes at Semipalatinsk
<b>RUSSIA</b>					
Arzamas-16	warhead design; warhead assembly/ dismantlement	yes	yes	unsafeguarded <sup>2</sup>	Small-scale warhead dismantlement only
Sverdlovsk-45	warhead assembly/ dismantlement	yes	yes	unsafeguarded	
Zlatoust-36	warhead assembly/ dismantlement	yes	yes	unsafeguarded	

<sup>1</sup> Weapons-usable fissile material includes uranium enriched to 90% or more in the isotope U-235 (referred to below as Highly-Enriched Uranium, or HEU) and all forms of plutonium. About fifteen kilograms of HEU or five kilograms of plutonium are required for a nuclear weapon.

Principal sources for this table are William Potter, *Nuclear Profiles of the Soviet Successor States*, 1993; "Research-and-Production Association 'Luch'," 1993; Thomas B. Cochran and Robert S. Morris, *Russian/Soviet Nuclear Warhead Production, Nuclear Weapons Data Book Working Papers* (Washington, DC: Natural Resources Defense Council, 1993).

<sup>2</sup> As a nuclear-weapon-state party to the NPT, Russia is not required to place its nuclear facilities under IAEA safeguards.

Table I-D. -- Locations with Fissile Material, con't.

LOCATION	ACTIVITY	PLUTONIUM	WEAPONS-USABLE URANIUM	IAEA SAFEGUARDS STATUS	COMMENTS
<b>RUSSIA--con't.</b>					
Chelyabinsk-65 <sup>3</sup>	plutonium and tritium production reactors; spent fuel reprocessing; production of fuel pellets	yes	presumed	unsafeguarded	All plutonium production reactors have been closed, but plutonium separation continues. Two isotope-production reactors, formerly and perhaps currently used for the production of tritium, are operating.
Krasnoyarsk-26	plutonium production reactors; spent fuel reprocessing	yes	yes	unsafeguarded	Two of three plutonium production reactors have been closed, but plutonium production and separation activities continue. <sup>4</sup>
Tomsk-7 <sup>5</sup>	plutonium production reactors; spent fuel reprocessing; production of Pu and U warhead components; storage of Pu triggers from dismantled warheads <sup>6</sup> ; oxidation of HEU metal from dismantled warheads <sup>7</sup>	yes	yes	unsafeguarded	Three of five plutonium production reactors have been closed, but plutonium production and separation activities continue. <sup>8</sup>

<sup>3</sup> Proposed site of a fissile material storage center financed in large part by the United States.

<sup>4</sup> The last reactor at Krasnoyarsk-26 will be shut down and spent-fuel reprocessing will cease under an agreement between Russia and the United States signed in March 1994. The agreement will take several years to implement (see "Russia to Close 3 Reactors," *Washington Post*, March 17, 1994).

<sup>5</sup> Proposed site of a fissile material storage center financed by Japan.

<sup>6</sup> Under an agreement announced on March 15, 1994, U.S. inspectors will be allowed into facilities at Tomsk-7 to verify the number of dismantled warheads and to verify that plutonium is being stored safely and securely (see "Accord Set on Nuclear Inspections," *Washington Post*, March 16, 1994).

<sup>7</sup> The converted uranium will be sent to Sverdlovsk-44 for "blending-down" into Low-Enriched Uranium (see *Nuclear Fuel*, March 28, 1994).

<sup>8</sup> The two remaining reactors at Tomsk will be shut down and spent-fuel reprocessing will cease under an agreement reached between Russia and the United States in March 1994. The agreement will take several years to implement (see "Russia to Close 3 Reactors," *Washington Post*, March 17, 1994).

Table I-D. -- Locations with Fissile Material, con't.

LOCATION	ACTIVITY	PLUTONIUM	WEAPONS-USABLE URANIUM	IAEA SAFEGUARDS STATUS	COMMENTS
<b>RUSSIA--con't.</b>					
Sverdlovsk-44	Highly-Enriched Uranium (HEU) production; "blending down" of HEU from dismantled warheads into LEU <sup>9</sup>		yes	unsafeguarded	Although the USSR stopped production of HEU in 1989, HEU produced in the 1980s may still be stored at Sverdlovsk-44. <sup>10</sup>
Institute of Physics and Power Engineering (Obninsk)	research reactor; research on weapon-grade materials		reactor fueled with app. 120 kg of HEU	unsafeguarded	The research reactor has 150 kg of weapon-grade plutonium; the research facility has 750 kg of weapons-grade plutonium. <sup>11</sup>
Lenin Institute of Physics (St. Petersburg)	research reactor		reactor fueled with app. 20 kg of HEU	unsafeguarded	
Scientific Research Inst. for Atomic Reactors (Dmitrovgrad)	one fast breeder reactor; research reactors; fabrication of mixed-oxide fuel elements	app. 350 kg of plutonium believed to be present	research reactors fueled with a total of app. 25 kg of HEU	unsafeguarded	Fast breeder reactor fueled with plutonium and an unknown quantity of uranium enriched to 45%-90%.
<b>UKRAINE</b>					
Khar'kiv Physical Technical Institute			less than 12 kg of HEU	safeguards agreement not yet concluded	HEU is in bulk form.

<sup>9</sup> The Low-Enriched Uranium will be sold to the United States Enrichment Corporation for eventual use in nuclear power reactors. American inspectors will be allowed into Sverdlovsk-44 to verify that the HEU actually comes from dismantled warheads (see *Nuclear Fuel*, March 28, 1994).

<sup>10</sup> Three other sites, Krasnoyarsk-45, Tomsk-7, and Angarsk produce low-enriched uranium for use as fuel for nuclear power plants. These facilities are capable of producing HEU but are believed not to have produced it in the past.

<sup>11</sup> "Energy Conversion of Weapons Grade Plutonium," by V. M. Murogov, in *Nuclear Fuel Reprocessing, Storage and Usage of Power Plant and Weapons Grade Plutonium*, International Seminar, Moscow, December 14-16, 1992, p. 126.

**Table I-E. Russian Nuclear Weapon and Nuclear Power Infrastructure  
By Administrative Division<sup>1</sup>**

**NOTE: Administrative Divisions in Bold Italics Contain Nuclear Weapons or Quantities of Weapons-Usable Nuclear Material Sufficient for One or More Nuclear Weapons**

ADMINISTRATIVE DIVISION	NUCLEAR WEAPONS/NUCLEAR FACILITIES
Adygeya	
Aginskiy Buryat	
<b>Altay</b>	ICBM base ( <i>Aleysk</i> )
<b>Amur</b>	ICBM base ( <i>Svobodnyy</i> ), heavy bomber base ( <i>Ukrainka</i> )
Arkhangel'sk	Submarine/surface ship propulsion reactors, SLBM storage, SLBM testing, SLBM conversion/elimination, ICBM testing, ICBM training, ballistic missile equipped submarine production, SLBM loading
Astrakhan	
Bashkortostan	
Belgorod	
Bryansk	
Buryatia	
<b>Chelyabinsk</b>	ICBM base ( <i>Kartaly</i> ); nuclear weapons/nuclear warhead design ( <i>Chelyabinsk-70</i> ); spent fuel reprocessing, five plutonium production reactors (shut down), MOX fuel fabrication (suspended), nuclear waste vitrification, tritium production reactors, proposed site of a fissile material storage center ( <i>all at Chelyabinsk-65</i> ); SLBM production
<b>Chita</b>	ICBM bases ( <i>Drovyanaya, Yasnaya</i> ), processing of uranium ore ( <i>Krasnokamensk</i> )
Chukotka	Four GBWR-12 power reactors ( <i>Bilibino</i> , 11 MWe total, uranium enriched to 3.0-3.6%)
Chuvashia	
Dagestan	
Evenkia	
Gorno-Altay	
Chechen Republic	
Ingushetia	
<b>Irkutsk</b>	ICBM base ( <i>Irkutsk</i> ), uranium enrichment ( <i>Angarsk</i> ), uranium hexafluoride production ( <i>Angarsk</i> )
<b>Ivanovo</b>	ICBM base ( <i>Teykovo</i> )
Kabardino-Balkaria	
Kaliningrad	
Kalmykia	
<b>Kaluga</b>	ICBM base ( <i>Kozel'sk</i> ), research reactor ( <i>Obrninsk</i> , 120 kg of HEU, enriched to 90%), ICBM training

<sup>1</sup> Principal sources for this table are William Potter, *Nuclear Profiles of the Soviet Successor States*, 1993; "Research-and-Production Association 'Luch,'" 1993; Thomas B. Cochran and Robert S. Morris, *Russian/Soviet Nuclear Warhead Production*, Washington, D.C.: Natural Resources Defense Council, 1993; START Memorandum of Understanding, September 1990. For references regarding the names of the administrative divisions, see Article 65, Constitution of Russia, Rossiyskiye Vesti, December 25, 1993, pp. I-III.

Table I-E. -- Russian Nuclear Infrastructure, con't.

ADMINISTRATIVE DIVISION	NUCLEAR WEAPONS/NUCLEAR FACILITIES
<b>Kamchatka</b>	Base for ballistic missile equipped submarines ( <i>Rybachiy</i> ), submarine/surface ship propulsion reactors
Karachay-Cherkessia	
Karelia	
Kemerovo	ICBM production
Khabarovsk	
Khakassia	
Khanty-Mansi	
<b>Kirov</b>	ICBM base ( <i>Yur'ya</i> )
Komi	
Komi-Perm	
Koryak	
<b>Kostroma</b>	ICBM base ( <i>Kostroma</i> )
Krasnodar	ICBM training
<b>Krasnoyarsk</b>	ICBM bases ( <i>Uzhur, Krasnoyarsk, Kansk</i> ); uranium enrichment ( <i>Krasnoyarsk-45</i> ); spent fuel reprocessing, plutonium production reactors (two of three reactors shut down), uranium hexafluoride production, spent fuel storage ( <i>all at Krasnoyarsk-26</i> ), SLBM production
Kurgan	
Kursk	Four RMBK-1000 power reactors ( <i>Kursk</i> , 925 MWe total, uranium enriched to 2%), spent fuel storage
<b>Leningrad Oblast/ St. Petersburg city</b>	Two research reactors ( <i>St. Petersburg</i> , 20.4 kg total of uranium enriched to 90%), four RMBK-1000 power reactors ( <i>Sosonovy Bor</i> , 925 MWe total, uranium enriched to 2%)
Lipetsk	
Magadan	
<b>Mari-El</b>	ICBM bases ( <i>Yoshkar-Ola</i> )
Mordovia	
<b>Moscow Oblast and City of Moscow</b>	Anti-Ballistic Missile bases, ICBM production, ICBM training, heavy bomber testing and training, fuel rod fabrication ( <i>Electrosta Machine Building Plant</i> ), Research reactors: <i>Kurchatov Institute</i> (5 kg HEU and 4 kg LEU) and <i>Institute of Nuclear Research</i> (unknown quantity of uranium enriched to 90%), numerous nuclear research institutes
<b>Murmansk</b>	Bases for ballistic missile equipped submarines ( <i>Nerpich'ya, Yagel'naya, Olen'ya, Ostrovnoy</i> ), submarine/surface ship propulsion reactors, SLBM storage, two VVER-440 V-230 power reactors ( <i>Polyarnye Zori</i> , 411 MWe total, uranium enriched to 3.6%), two VVER-440 V-213 power reactors ( <i>Polyarnye Zori</i> , 411 MWe total, uranium enriched to 3.3%)
Nenetsk	
<b>Nizhniy Novgorod</b>	Warhead assembly/dismantlement ( <i>Arzamas-16</i> ), nuclear warhead design ( <i>Arzamas-16</i> ), ICBM storage ( <i>Sarovatikh</i> )

Table I-E. -- Russian Nuclear Infrastructure, con't.

ADMINISTRATIVE DIVISION	NUCLEAR WEAPONS/NUCLEAR FACILITIES
<b>North Ossetia</b>	Heavy bomber base ( <i>Mozdok</i> )
Novgorod	
<b>Novosibirsk</b>	ICBM base ( <i>Novosibirsk</i> ), fuel rod and pellet fabrication ( <i>Novosibirsk Chemical Concentrate Plant</i> ), SLBM conversion/elimination
Omsk	
Orel	
<b>Orenburg</b>	ICBM base ( <i>Dombarovskiy</i> )
Penza	Production of electronic components for warheads ( <i>Penza-19</i> )
<b>Perm</b>	ICBM bases ( <i>Bershet</i> ), possible warhead production, ICBM training
<b>Primorskiy</b>	Base for ballistic missile equipped submarines ( <i>Pavlovskoye</i> ), submarine/surface ship propulsion reactors, submarine reactor waste storage, SLBM conversion/elimination
Pskov	
Rostov	Fuel fabrication for VVER reactors ( <i>Volgodonsk</i> ), ICBM training, ICBM repair
Ryazan'	Heavy bomber training and repair
Sakha (Yakutia)	
Sakhalin	
Samara	Heavy bomber production
<b>Saratov</b>	ICBM Base ( <i>Tatishchevo</i> ), former heavy bomber base ( <i>Engel's</i> ), heavy bomber conversion/elimination, four VVER-1000 reactors ( <i>Balokovo</i> , 940 MWe total, uranium enriched to 4.4%)
Smolensk	Three RMBK-1000 reactors ( <i>Smolensk</i> , 925 MWe total, uranium enriched to 2%)
Stavropol	Uranium mining
<b>Sverdlovsk</b>	ICBM Base ( <i>Nizhniy Tagil</i> ), warhead assembly/dismantlement/storage ( <i>Sverdlovsk-45</i> ), possible storage of weapons-grade uranium, "blending down" of weapons-grade uranium into low-enriched uranium ( <i>Sverdlovsk-44</i> ), research reactor ( <i>Yekaterinburg</i> , 1.7 kg of uranium enriched to 90%), one BN-600 fast breeder reactor ( <i>Beloyarsk</i> , 600 MWe, uranium enriched to 20-25%)
Tambov	
Taymyr	
Tatarstan	Heavy bomber production
<b>Tomsk</b>	Spent fuel reprocessing, uranium enrichment, plutonium production reactors (3 of 5 shut down), production of plutonium and uranium warhead components, storage of Pu triggers from dismantled warheads, oxidation of weapons-grade uranium metal from dismantled warheads, proposed site of fissile material storage center (all at <i>Tomsk-7</i> )
Tula	
Tuva	
<b>Tver'</b>	ICBM base ( <i>Vypolzovo</i> ), two VVER-1000 power reactors ( <i>Kalinin</i> , 950 MWe total, uranium enriched to 3.3-4.4%), third unit nearly complete



Table I-E. -- Russian Nuclear Infrastructure, con't.

ADMINISTRATIVE DIVISION	NUCLEAR WEAPONS/NUCLEAR FACILITIES
Tyumen'	
Udmurtia	ICBM storage, ICBM production
Ul'yanovsk	Mixed-oxide fuel production ( <i>Dmitrovgrad</i> , 350 kg of plutonium present), research reactors ( <i>Dmitrovgrad</i> , 25 kg total of uranium enriched to 90%, 37 kg total of uranium enriched to 63%), one BOR-60 fast breeder reactor ( <i>Dmitrovgrad</i> , 11 MWe, initial core of uranium enriched up to 90%), one VK-50 power reactor ( <i>Dmitrovgrad</i> , 50 MWe, uranium enriched to 1.5-2.0%), ICBM production
Ust Ordynski Buryat	
Vladimir	
Volgograd	ICBM launcher production
Vologda	
Voronezh	Two VVER-440 V-179 power reactors ( <i>Novovoronezh</i> , 385 MWe total, uranium enriched to 3.6%), one VVER-1000 V-187 power reactor ( <i>Novovoronezh</i> , 950 MWe, uranium enriched to 4.4%)
Yamal-Nenetsk	
Yaroslavl'	
Yevrey	

**Table I-F. Status of Disarmament Assistance Programs<sup>1</sup>**

**1. U.S. "Nunn-Lugar" Program**

<b>COUNTRY</b>	<b>PROJECT</b>	<b>AMOUNT PROPOSED (as of 3/94)</b>	<b>AMOUNT OBLIGATED (as of 3/94)</b>	<b>COMMENTS</b>
<b>FSU TOTAL</b>		<b>961,040,000</b>	<b>117,440,000</b>	
<b>General Assessment/ Support</b>		15,000,000	3,347,000	
<b>BELARUS</b>	Emergency Response Communications Link Export Controls Environmental Restoration Defense Conversion Missile Propellant Elimination Military-to-Military Contacts	5,000,000 2,300,000 16,260,000 25,000,000 20,000,000 6,000,000 1,500,000	3,698,000 302,000 438,000 210,000 518,000 0 --- <sup>2</sup>	President Clinton promised an additional \$25 million in aid for disarmament during his visit to Minsk in January 1994.
	<b>SUBTOTAL</b>	<b>76,060,000</b>	<b>5,166,000</b>	
<b>KAZAKHSTAN</b>	Emergency Response Equipment Communications Link Export Controls Material Control and Accounting Military-to-Military Contacts Defense Conversion Strategic Off. Arms Elimination	5,000,000 2,300,000 2,260,000 5,000,000 400,000 15,000,000 70,000,000	0 8,000 0 0 --- 0 113,000	In exchange for Kazakhstan's accession to the NPT in February 1994, President Clinton promised to disburse the \$85 million for disarmament assistance committed by that date and promised \$311 million in economic assistance to Kazakhstan. <sup>3</sup>
	<b>SUBTOTAL</b>	<b>99,960,000</b>	<b>121,000</b>	

<sup>1</sup> "CTR Programs by Country" and "CTR Obligations by Country/Project," Department of Defense, Office of Cooperative Threat Reduction, March 1994.

<sup>2</sup> Because the Department of Defense has not broken down the figures for Military-to-Military Contacts by country, the \$202,000 obligated for this purpose has been included in the General Support/Assessment category.

<sup>3</sup> *Radio Free Europe/Radio Liberty Daily Report*, February 15, 1994.

Table I-F. -- Status of Disarmament Assistance Programs, con't.

COUNTRY	PROJECT	AMOUNT PROPOSED (as of 3/94)	AMOUNT OBLIGATED (as of 3/94)	COMMENTS
U.S. ASSISTANCE-- con't.				
RUSSIA	Armored Blankets Railcar Security Emergency Reponse Equipment Material Control and Accounting Fissile Material Containers Storage Facility Design Storage Facility Equipment Export Controls Intl. Science & Tech. Center Chemical Weapons Dismantlement Strategic Off. Arms Elimination Military-to-Military Contacts Arctic Nuclear Waste Assessment Defense Conversion Chemical Demilitarization Lab  <b>SUBTOTAL</b>	5,000,000 21,500,000 15,000,000 30,000,000 50,000,000 15,000,000 75,000,000 2,260,000 25,000,000 25,000,000 130,000,000 9,200,000 20,000,000 40,000,000 30,000,000  <b>492,960,000</b>	3,244,000 20,000,000 11,342,000 416,000 42,897,000 14,954,000 0 0 1,416,000 2,662,000 4,202,000 --- <sup>4</sup> 7,373,000 69,000 50,000  <b>108,625,000</b>	
UKRAINE	Emergency Response Equipment Communications Link Export Controls Material Control and Accounting Intl. Science & Tech. Center Strategic Off. Arms Elimination Military-to-Military Contacts Nuclear Reactor Safety Defense Conversion  <b>SUBTOTAL</b>	5,000,000 2,400,000 7,260,000 12,500,000 10,000,000 185,000,000 3,900,000 11,000,000 40,000,000  <b>277,060,000</b>	0 8,000 8,000 0 0 164,000 --- 1,000 0  <b>181,000</b>	On February 10, 1994, President Clinton announced a doubling of U.S. aid to Ukraine for disarmament and a doubling of bilateral economic aid. <sup>5</sup>

<sup>4</sup> Because the Department of Defense has not broken down the figures for Military-to-Military Contacts by country, the \$202,000 obligated for this purpose has been included in the General Support/Assessment category.

<sup>5</sup> *Radio Free Europe/Radio Liberty Daily Report*, February 11, 1994.

Table I-F. -- Status of Disarmament Assistance Programs, con't.

## 2. Other Disarmament Assistance Programs

COUNTRY	JAPANESE ASSISTANCE PROGRAMS <sup>6</sup>	OTHER ASSISTANCE PROGRAMS	COMMENTS
<b>BELARUS</b>	Japan has signed framework agreements with Belarus and has pledged \$8.37 million dollars in disarmament aid to Belarus.		In January 1994, the Swedish government approved \$6.1 million in aid for nuclear fuel accounting and control in the NIS. <sup>7</sup>
<b>KAZAKHSTAN</b>	Japan has signed framework agreements with Kazakhstan and has pledged \$11.43 million in disarmament aid to Kazakhstan.		
<b>RUSSIA</b>	Russia and Japan have signed framework agreements providing for disarmament aid in five areas: fissile material storage, research on peaceful uses of fissile material, application of IAEA safeguards on the material, coping with environmental pollution, and disposal of liquid rocket fuel after dismantlement. <sup>8</sup> Russia will receive \$79.99 million in disarmament aid from Japan in addition to the \$17 million already pledged by Japan for the International Science and Technology Center in Moscow.	The European Union has pledged \$25 million toward the International Science and Technology Center in Moscow. <sup>9</sup>  France has signed agreements with Russia worth \$98 million to supply radiation security equipment, transport containers, and machine tools. Some equipment has already been sent. <sup>10</sup>	
<b>UKRAINE</b>	Japan has signed framework agreements with Ukraine and has pledged \$17.08 million in disarmament aid to Ukraine. Aid is not contingent upon Ukraine's accession to the NPT.	Canada has pledged \$11 million in disarmament aid to Ukraine. <sup>11</sup>	

<sup>6</sup> Figures on Japanese aid from "Four Ex-Soviet States Share Japanese Aid," *Defense News*, April 11-17, 1994.

<sup>7</sup> *Nuclear News*, February 1994, p. 50.

<sup>8</sup> "Japan/Russia Sign Pact," Naoaki Usui, *Nucleonics Week*, October 14, 1993, p. 13.

<sup>9</sup> Brooks Tigner, "Center Aims to Keep Russian Scientists in Friendly Camp," *Defense News*, March 28, 1994.

<sup>10</sup> "Russia to Receive Warhead Dismantling Equipment," *AFP*, October 21, 1993, as translated in FBIS-WEU-93-203, October 22, 1993.

<sup>11</sup> Ron Popeski, "Canada Gives Ukraine Nuclear Disarmament Funds," *Reuter*, April 1, 1994.

## PART II -- EXPORT CONTROLS AND SENSITIVE EXPORTS

**Table II-A. Most Sensitive Potential Nuclear and Missile Exports  
(Other than Complete Nuclear Weapons)**

COMMODITY	PRINCIPAL PRODUCTION FACILITIES/SOURCE	Subject to Export Controls	COMMENTS
<b>BELARUS</b>			
Weapons-Usable Fissile Material	See Table I-D		
Research Reactors	Institute of Power, Engineering Problems, Sosny. <i>Manufacturing capability unlikely</i>		IRT-M reactor shut down in 1988. Two critical assemblies.
<b>KAZAKHSTAN</b>			
Weapons-Usable Fissile Material	See Table I-D		
Research Reactors	10 MWe WWR-R, Almaty; three experimental reactors at Semipalatinsk (IGR, IWG-IM, RA). <i>Manufacturing capability unlikely</i>		Reactor in Almaty shut down in 1988.
Beryllium	Ust-Kamenogorsk		Dual-use item on NSG list.
Nuclear-Weapon Test Equipment	Semipalatinsk		
Low-enriched Uranium (Bulk and Sintered Pellets)	Ust-Kamenogorsk		
<b>RUSSIA</b>			
Weapons-Usable Fissile Material	See Tables I-D and I-E	Yes	
Low-Enriched Uranium (Bulk)	Sverdlovsk-44, Krasnoyarsk-45, Tomsk-7, Angarsk	Yes	
Low-enriched Uranium (Fuel Rods)	Electrostal Machine Building Plant (Moscow); Novosibirsk Chemical Concentrate Plant (Novosibirsk)	Yes	
Uranium and Plutonium Fuel Production & Fabrication Technology	Scientific Research Institute for Atomic Reactors (Dmitrovgrad)	Some items	Key components on NSG nuclear list; some items on NSG dual-use list.
Research Reactors	Approximately 20; <sup>1</sup> Various locations	Yes	
Nuclear Power Plants	Approximately 28; Various locations		

<sup>1</sup> See Potter, *Nuclear Profiles of the Soviet Successor States*, and Oleg Bukharin, "The Structure and the Production Capabilities of the Nuclear Fuel Cycle in the Countries of the Former Soviet Union," Center for Energy and Environmental Studies, Princeton University, January 1993.

Table II-A. -- Most Sensitive Potential Exports, con't.

COMMODITY	PRINCIPAL PRODUCTION FACILITIES/SOURCE	Subject to Export Controls	COMMENTS
Reprocessing Technology/Facilities	Chelyabinsk-65; Tomsk-7; Krasnoyarsk-26; All Russian Scientific Research Institute of Inorganic Materials (Moscow)	Yes	
Enrichment Technology/Facilities	Sverdlovsk-44; Krasnoyarsk-45; Tomsk-7; Angarsk	Yes	
Nuclear Weapon Design and Fabrication / Nuclear Testing Technology and Equipment	Arzamas-16; Chelyabinsk-70; Novaya Zemlya; Impulse Technique Research & Design Institute (Moscow); Automatics Research Institute	Yes	
Nuclear-Capable Ballistic Missiles (All ranges), Components, & Production Technology	Various locations	Yes	
Nuclear Capable Cruise Missiles, Components, & Production Technology	Various locations	Yes	
<b>UKRAINE</b>			
Weapons-Usable Fissile Material	See Table I-D		
Heavy Water	Dnepropetrovsk		
Low-Enriched Uranium (Fuel Rods)	No production; re-export of fuel for nuclear power plants		
Missile/Missile Component Production and Technology	Dnepropetrovsk; Khar'kiv; Pavlograd	yes <sup>2</sup>	
Zirconium	Dneprodzerzhinsk		Dual-use item on NSG list.
Hafnium	Dneprodzerzhinsk		Dual-use item on NSG list.
Uranium Oxide	Dneprodzerzhinsk		
Ion Exchange Resin	Dneprodzerzhinsk		Dual-use item on NSG list.
Research Reactors	10 MWe WWR-M, Kiev; 200 KWe WWR, Sevastopol; Subcritical Assembly, Sevastopol. <i>Manufacturing capability unlikely</i>		

<sup>2</sup> In a Memorandum of Understanding signed in Washington on May 13, 1994, Ukraine agreed to conduct its missile-related exports according to the criteria and standards of the Missile Technology Control Regime (MTCR). It is not, however, a formal party to the MTCR.

**Table II-B. Status of Export Controls<sup>1</sup>**

CONTROL MECHANISM	STATUS/COMMENTS
<b>BELARUS</b>	
Nuclear Non-Proliferation Treaty (NPT)	Non-nuclear-weapon state party. Treaty requires all exports of nuclear facilities, materials, and nuclear-unique components to be subject to IAEA safeguards in recipient country.
Nuclear Suppliers Group (NSG)	Not member or otherwise adhering to NSG standards.
Other Pledge to Ensure Nuclear Exports Are Placed Under IAEA Inspection by Recipient	No.
Missile Technology Control Regime (MTCR)	Not member or otherwise formally adhering to MTCR standards.
Domestic Export Controls (Nuclear)	<p>Legal basis of export controls is a series of governmental decrees, the most important of which are: <i>Decree No. 386</i> (October 16, 1991) On Regulations Governing Exports and Imports; <i>Decree No. 50</i> (February 3, 1992) On Quotas and Licensing of Exports and Imports of Commodities on the Territory of Belarus; <i>Decree No. 516</i> (August 21, 1992) On Creating Controls in the Field of Exports and Commodities (Goods/Services) in the Republic of Belarus; <i>Decree No. 573</i> (September 22, 1992) On the Introduction of Changes to the Decree of the Republic of Belarus' Council of Ministers No. 386; <i>Decree No. 782</i> (December 28, 1992) On State Regulations and Control of Foreign Economic Relations; <i>Decree No. 344</i> (May 25, 1993) On a Unified System for Establishing Quotas and Issuing Licenses to Import and Export Commodities (Goods/Services) on the Territory of the Republic of Belarus; <i>Decree No. 568</i> (August 20, 1993) On Improvement of Foreign Economic Activities; <i>Decree No. 733</i> (October 25, 1993) On Violations of the Procedures for Establishing Quotas and Issuing Licenses to Import and Export Commodities (Goods/Services); <i>Decree No. 82</i> (December 19, 1993) On Transfer Restrictions of Dangerous Items and Materials Across the Border of the Republic of Belarus.</p> <p>Belarus currently is drafting an overarching export control law.</p> <p>Belarus is party to the June 26, 1992, Minsk Accord on CIS Export Control Coordination. On February 9, 1993, it reached an agreement with five other CIS states to cooperate in the control of exports which could be used to manufacture weapons of mass destruction.</p> <p>On October 22, 1992, an agreement was concluded between the United States and Belarus, "Concerning the Provision of Assistance Related to Establishing an Arms Control System to Prevent Proliferation of Weapons of Mass Destruction from Belarus."</p>
Domestic Export Controls (Missile)	--- ??? ---

<sup>1</sup> The principal sources for this table are Potter, *Nuclear Profiles of the Soviet Successor States*, May 1993; Elina Kirichenko, "Nuclear Non-proliferation Export Controls of Russia," (MIIS CIS Non-proliferation Project working paper, November 1993); Ural Latypov, "Export Controls in Belarus," (MIIS CIS Non-proliferation Project working paper, March 1994).

Table II-B. -- Status of Export Controls, con't.

CONTROL MECHANISM	STATUS/COMMENTS
<b>KAZAKHSTAN</b>	
Nuclear Non-Proliferation Treaty	Non-nuclear-weapon state party. Treaty requires all exports of nuclear facilities, materials, and nuclear-unique components to be subject to IAEA safeguards in recipient country.
Nuclear Suppliers Group	Not member or otherwise adhering to NSG standards.
Other Pledge to Ensure Nuclear Exports are Placed Under IAEA Inspection by Recipient	No.
Missile Technology Control Regime	Not member or otherwise adhering to MTCR standards.
Domestic Export Controls (Nuclear)	<p>The export control structure in Kazakhstan is still in its formative stage. The legal basis of export controls appears to be Cabinet of Ministers <i>Decree No. 183</i> (March 9, 1993) On Control of Export/Import of Nuclear Materials, Special Non-Nuclear Materials, and Dual-Use Materials.</p> <p>Kazakhstan is party to the June 26, 1992 Minsk Accord on CIS Export Control Coordination. On February 9, 1993, it reached an agreement with five other CIS states to cooperate in the control of exports which could be used to manufacture weapons of mass destruction.</p>
Domestic Export Controls (Missile)	--- ??? ---
<b>RUSSIA</b>	
Nuclear Non-Proliferation Treaty	Nuclear-weapon-state party. Treaty prohibits transferring nuclear weapons to non-nuclear states or otherwise assisting them to acquire such weapons; requires all exports of nuclear facilities, materials, and nuclear-unique components to be subject to IAEA inspection in recipient country. <sup>2</sup>
Nuclear Suppliers Group	Member. Bans nuclear exports to states not having all of their nuclear facilities under IAEA safeguards; requires export licensing of dual-use (nuclear/non-nuclear) items; requires restraint in transfer of reprocessing and enrichment technology; has adopted detailed export control list. <sup>3</sup>
Missile Technology Control Regime	Has signed accord with U.S. formally agreeing to abide by MTCR standards and parameters, November 1, 1993. MTCR restricts transfers of missiles, components, and related production technology with respect to missiles able to carry nuclear, chemical, or biological warheads to a distance of 300 kilometers or more. Members have adopted detailed export control list.

<sup>2</sup> Since Kazakhstan and Ukraine have not yet concluded safeguards agreements with the IAEA, continuing Russian exports of low-enriched uranium and fabricated nuclear fuel to these states constitute an infringement of this NPT requirement.

<sup>3</sup> Recognizing the unusual circumstances of the break-up of the Soviet Union, the Nuclear Suppliers Group agreed that on-going supply commitments, such as those between Russia and a number of former Soviet republics, would be exempted from the rule that recipient states must have all of their nuclear facilities under IAEA safeguards.



Table II-B. -- Status of Export Controls, con't.

CONTROL MECHANISM	STATUS/COMMENTS
<b>RUSSIA--con't.</b>	
Domestic Export Controls (Nuclear)	<p>Legal basis of export controls is principally a series of governmental decrees, the most important of which are: <i>Decree No. 179</i> (February 22, 1992) On Categories of Products (Works/Services) and Industrial Wastes, Sale of Which is Prohibited; <i>Decree No. 312</i> (March 27, 1992) On Control Over Export of Nuclear Materials, Equipment, and Technology from the Russian Federation (This decree stipulated Russian adherence to the policy of full-scope safeguards as a condition of export); <i>Decree No. 388</i> (April 11, 1992) On Measures to Establish an Export Control System in Russia; <i>Decree No. 507</i> (May 12, 1992) On Military and Technological Cooperation Between the Russian Federation and Foreign Countries. An export control list on dual-use material, equipment, and technology conforming to the NSG list was approved by <i>Presidential Order No. 827</i> (December 28, 1992) and by <i>Governmental Regulation No. 68</i> (January 7, 1993). An earlier government resolution (<i>No. 366</i>, May 29, 1992) approved the NSG guidelines adopted in Warsaw in April 1992.</p> <p>Russia is also party to the June 26, 1992, Minsk Accord on CIS Export Control Coordination.</p> <p>On February 9, 1993, Russia reached an agreement with five other CIS states to cooperate in the control of exports which could be used to manufacture weapons of mass destruction.</p>
Domestic Export Controls (Missile)	<p>In compliance with <i>Decree No. 388</i> (April 11, 1992), a control list of equipment, materials, and technologies used for the production of missile weapons was approved by <i>Presidential Order No. 20</i> (January 27, 1993). The list is consistent with but not identical to the MTCR list.</p>
<b>UKRAINE</b>	
Nuclear Non-Proliferation Treaty	<p>Not party. No legal obligation to ensure all nuclear exports are placed under IAEA safeguards in recipient country.</p>
Nuclear Suppliers Group	<p>Not member or otherwise adhering to NSG standards. Sent observer to March, 1992 NSG meeting in Warsaw. Has requested similar observer status for the next NSG meeting in Madrid.</p>
Other Pledge to Ensure Nuclear Exports are Placed Under IAEA Inspection by Recipient	<p>No.</p>
Missile Technology Control Regime	<p>On May 13, 1994, Ukrainian Deputy Prime Minister Valery Shmarov and Vice President Albert Gore signed a Memorandum of Understanding in which Ukraine agreed to conduct its missile and space related exports according to the criteria and standards of the MTCR. Ukraine is not, however, a formal party to the MTCR.</p>

Table II-B. -- Status of Export Controls, con't.

CONTROL MECHANISM	STATUS/COMMENTS
UKRAINE--con't.	
Domestic Export Controls (Nuclear)	<p>Legal basis of export controls is a series of governmental decrees, the most important of which are: <i>Decree No. 160</i> (March 4, 1993) On Establishing State Controls Over Exports/Imports of Arms, Military Material, and Material Needed for Their Production. This decree, which superseded <i>Decree No. 153</i> (March 23, 1992) established a State Commission on Export Controls and an Expert-Technical Committee. <i>Decree No. 778</i> (September 21, 1993) About the Expert-Technical Committee Under the Cabinet of Ministers. The Expert-Technical Committee is now reviewing a draft of "Regulations on Procedures for the Export and Import of Nuclear Materials, Technology, Equipment, Facilities, Special Non-Nuclear Materials, Sources of Radiation and Isotopes." The initial draft was prepared in March 1993 by the Ukrainian State Committee on Nuclear and Radiation Safety.</p> <p>Article 20 of the Act on Foreign Economic Activity, adopted by the parliament in 1991, specifies that the export and import of weapons, special components for their manufacture, explosive agents, nuclear material, technologies, equipment, installations as well as other kinds of goods, technologies, and services that could be used for weapons and military weapons hardware production are activities that require authorization by the State.</p> <p>A law on the Utilization of Atomic Energy and Radiation Protection was drafted by the Ukrainian Parliament on June 10, 1992. The draft was revised in January 1993, but has not yet been adopted.</p>
Domestic Export Controls (Missile)	Ukraine has created an Interagency Working Group headed by the Expert-Technical Committee to prepare a national control list consistent with the MTCR.

**Table II-C. Significant Recent Exports**

COUNTRY	DETAILS OF EXPORT	COMMENTS
<b>BELARUS</b>		
Formally Approved Exports		
Reported Illicit Exports	See Chronology of Illicit Exports	
<b>KAZAKHSTAN</b>		
Formally Approved Exports	Shipments of low-enriched uranium pellets to Russia	
Reported Illicit Exports	See Chronology of Illicit Exports	
<b>RUSSIA</b>		
Formally Approved Exports	Cryogenic rocket engines to India	Original agreement included sale of production technology, but this aspect was suspended at U.S. urging on the grounds that the sale would violate MTCR guidelines. Russia has agreed to sell seven cryogenic engines to India. <sup>1</sup>
	Contract for sale of two 440 MWe VVER nuclear power reactors to Iran <sup>2</sup>	Financing uncertain; export will be subject to IAEA safeguards in Iran.
	Agreement between Russia and China to build two nuclear power reactors at Liaoning and to provide a gas centrifuge uranium enrichment plant with output capability of 200,000 SWU/year <sup>3</sup>	Contract for enrichment plant has been concluded.
	Low enriched uranium to Kazakhstan for fuel pellet fabrication	Export not subject to IAEA safeguards in Kazakhstan, contrary to Russia's NPT obligations.
	Low enriched uranium fuel rods to Ukraine	Export not subject to IAEA safeguards in Ukraine, contrary to Russia's NPT obligations.
Reported Illicit Exports	See Chronology of Illicit Exports	
<b>UKRAINE</b>		
Formally Approved Exports	Only two nuclear-related items were licensed for export in 1993--uranium ore and the rare-earth metal bismuth.	
Reported Illicit Exports	See Chronology of Illicit Exports	

<sup>1</sup> *Radio Free Europe/Radio Liberty Daily Report*, March 31, 1994.

<sup>2</sup> *Wall Street Journal*, May 12, 1993, p. A-9; *Times* (of London), March 15, 1993.

<sup>3</sup> *Nucleonics Week*, December 31, 1993, p. 1.

**Chronology of Reported Illicit Exports for 1993 and First Quarter 1994  
from the Newly Independent States**

*[Compiled from the CIS Nuclear Database,  
Program for Non-Proliferation Studies,  
Monterey Institute of International Studies]*

*No attempt has been made to determine  
the veracity of these reports*

**3/3/94 - IZVESTIYA #41, "Rizhskii bank finansiruet trgovliu redkimi metallami iz Rossii," p. 3.**

An unusual document was published in a recent issue of the newspaper Diena: the Latvian Bank of Reconstruction and Development has provided a Finnish firm with credit on the scale of \$4.555 billion for the purchase of osmium in Russia. The document indicates that "we have been offered 32.9 kg of Osmium-187 for a reasonable price -- US \$64,450 per gram." According to Diena, such transactions involving rare metals are occurring with increasing frequency.

**2/17/94 - IZVESTIYA #31, "Litva ne v silakh ostanovit' iadernuiu kontrabandu," p. 3.**

Povilas Vaishnis, head of the Lithuanian Nuclear Safety Inspectorate (VATESI), has neither confirmed nor denied German police reports to the effect that Vilnius and Kaunas have become a focal point for nuclear smuggling. Such fears have been on the rise since last year's theft of a fuel assembly from the Ignalina nuclear power plant; to this day the assembly's whereabouts remain unknown. According to Vaishnis, "We are trying to close the door on nuclear fuel exports, but it is a difficult task. We lack not only the necessary equipment and technical means, but also qualified customs personnel and experience in tracking down smugglers."

**2/9/94 - DER SPIEGEL #6, 1994, "It Brings Everyone to Their Knees," pp. 76-9.**

A plane, reportedly with stolen radioactive Cesium-137 on board, crashed in Lake Boden (Germany). There was no sign of the material when the airplane was brought to the surface, however, and the pilot and passengers (two Germans and one Czech woman) had disappeared. All four of them are suspected of being linked to the "Russian Nuclear Mafia," and the possibility has not been ruled out that the crash was planned to cover up a smuggling operation.

Around the time of the accident, German intelligence issued a report on the status of radioactive material smuggling which indicated that such trafficking was on the rise and involved material with higher enrichment levels. The report also claims that Lithuania (Vilnius and Kaunas) has become a major center of illegal nuclear trade. Also included in the article are the alleged current black market prices for various "strategic materials." [For additional coverage see also MOSCOW OSTANKINO TELEVISION NEWS 2/9/94.]

**1/17/94 - REUTER, "Greenpeace Says It Almost Got Nuclear Missile."**

A Soviet lieutenant stationed at Altengrabow (south of Berlin) reportedly offered Greenpeace a Scud missile, complete with nuclear warhead, in exchange for \$285,000 and political asylum in the West. He claimed to have access to the keys and codes needed for entry into the warhead storage area. In late July, however, the lieutenant disappeared, and was replaced by other security guards. The details of the story, known as "Operation Loose Cannon," are to appear in Critical Mass, a book about nuclear proliferation published in the United States. [See also THE WASHINGTON TIMES, "Greenpeace had chance to be a nuclear power," p. A13, 11/18/93.]

**1/13/94 - NUCLEONICS WEEK, "No Evidence Convicted Smuggler Had Access to Soviet Plutonium."**

In December 1993, the district court of Flensburg (Germany) issued a suspended sentence to a British subject who admitted having smuggled a 0.2 milligram sample of Pu-239 into Germany. The plutonium was concealed inside a Soviet-produced smoke detector that had been stolen in Bulgaria.

## **Chronology of Reported Illicit Exports, con't.**

In the German press, the incident received wide coverage as the first proven case of illegal plutonium sales involving material from the former Soviet Union.

**1/94**

There have been unconfirmed reports to the effect that drug trafficking groups in the Golden Triangle region of Southeast Asia have offered to pay up to US \$25 million for tactical nuclear devices from the Former Soviet Union. Similarly, members of Russian organized crime have allegedly promised to make tactical nuclear weapons available for the right price.

**12/30/93 - REUTER, "Ukraine Tightens Control Over Nuclear Materials."**

According to the Interfax-Ukraine news agency, President Leonid Kravchuk has called for increased control over security procedures at Ukraine's five nuclear power plants, putting security forces and the interior ministry in charge of investigating reported incidents of missing or stolen radioactive materials. Earlier in the month the government also established a special body to prevent the illegal export from Ukraine of potentially strategic materials.

**12/28/93 - CORRIERE DELLA SERA, "Traffico atomico: nei guai direttore di Semipalatinsk."**

The director of the Semipalatinsk polygon reportedly has been suspended from his duties on charges that he has allegedly been engaged in smuggling nuclear materials out of the facilities. The materials in question have been vaguely termed "valuable equipment and non-ferrous metals." Testing site facilities in Semipalatinsk were closed by Kazakh President Nazarbaev in 1991, following Kazakhstan's declaration of independence, but operations personnel are still there.

**12/27/93 - THE WASHINGTON TIMES, "Radioactive Smuggling Raises Fears of Nukes on Black Market," p. A13.**

Peter Kroemer, chief of the environmental crimes unit of the German federal police, has stated that over the course of last year there were eighteen instances of radioactive material being shipped into Germany -- presumably from Russia or other former Soviet republics -- for sale on the black market. To date, Kroemer maintains, none of this material has been weapons grade; however, he does not exclude the possibility of such material becoming available in the near future, given the increasing frequency of nuclear smuggling cases.

**12/24/93 - THE LOS ANGELES TIMES, "Nuclear Smugglers Caught, Ukraine Says."**

The Ukrainian Ministry of the Interior has announced that police apprehended six people who were attempting to smuggle ten ounces of nuclear materials out of Ukraine. The materials included radioactive materials which are used in nuclear weapons, medicine, and the reactors of nuclear power plants, but it was unclear as to whether any of them were weapons-grade. In a related case, 3.3 pounds of radioactive materials were confiscated Wednesday in Kishinev, and a joint investigation is currently underway. [See also THE UKRAINIAN WEEKLY, "Radioactive Contraband Smugglers Caught," vol. 62 no. 2, p. 2, 1/9/94; THE GUARDIAN 12/24/93; SUDDEUTSCHE ZEITUNG 12/24/93]

**12/23/93 - NUCLEONICS WEEK, "Fuel Rod Smuggling, Waste Leaks Raise Concerns in Norway."**

Norwegian radiation protection officials have expressed concern that nuclear material from the Former Soviet Union may be being smuggled into Norway. One such potential transaction involves three fuel rods apparently stolen from Murmansk, which reportedly contain enough enriched uranium to manufacture up to three nuclear bombs. The Norwegian Customs Service has requested that Geiger counters be provided for checking cars that cross the border into northern Norway. Since the fuel rods are unused, however, they would probably not generate much radiation, making them hard to spot.

**12/23/93 - REUTERS, "Six Detained With Radioactive Material."**

Ukrainian police arrested six people in Odessa who were trying to smuggle over ten ounces of highly-radioactive materials out of the country. \*[See also FBIS 12/23/93, "Attempt to Smuggle Radioactive Material Thwarted," citing Kiev Radio Ukraine World Service in English.]

## **Chronology of Reported Illicit Exports, con't.**

**12/17/93 - FBIS-CENTRAL EURASIA, "Navy Nuclear Inspector on Failure to Meet Standards" from Moscow Radio (12/16/93).**

Three spent fuel rods from submarine reactors were stolen on November 27th from a Northern Fleet strategic depot near Murmansk. According to the Head of the Nuclear Safety Inspectorate for the Nuclear Installations of Russia's Ministry of Defense, spent fuel storage facilities are "crammed full. Stores for fresh nuclear fuel do not meet nuclear safety standards and there is the problem of ships taken out of combat service, that is, the unloading of active areas." The Navy openly acknowledges the existence of nuclear fuel-related problems, but is apparently powerless to do anything to stop them on its own.

**12/8/93 - JPRS-TND, "Security Police Prevent Smuggling Nuclear Technology," p. 55, originally from SVENSKA DAGBLADET in Swedish.**

Sweden's security police is working in cooperation with other Swedish authorities in order to prevent Sweden from becoming a transit point for illegal traffic in nuclear technologies and radioactive substances. In this connection, customs procedures along Sweden's borders have been significantly tightened through the use of both fixed installations and mobile equipment. According to the Swedish security police, businessmen with contacts in the East seem to become involved in smuggling due to an exaggerated perception of the prices paid for nuclear and radioactive materials in the West.

**12/8/93 - JPRS-TND, "Radioactive Materials Said Trucked to West 'At Least Once,'" pp. 47-8, originally from Tallinn BNS 11/17/93.**

A Lithuanian trucking company from Vievis has allegedly been transporting radioactive materials to the West for the Moscow firm "Mars." Suspicions were aroused when the level of radioactivity in one empty trailer returning from Germany was found to exceed acceptable standards. To date, the whereabouts of the trailers' drivers are still unknown.

**12/7/93**

A Russian scientist has notified the MIIS Center for Russian and Eurasian Studies that he has information, based on Minatom documents, that an unknown quantity of highly-enriched uranium was diverted from the "Luch" production association in Podolsk, Russia. It is not known whether authorities have recovered the material.

**12/6/93 - THE WALL STREET JOURNAL, "Red Mercury is Hot, but the Question is: What Exactly Is It?"**

An overview of the ongoing debate as to what the enigmatic substance known as "red mercury" really is, and what its potential applications might be. [See entries from 5/93 and 7/93]

The Promekologiya concern claims to have signed a \$24.2 billion dollar contract with one API International Inc., based in Van Nuys, California, for the sale of 84 tons of red mercury. The substance is reportedly to be injected into oil wells in order to break up clotting and stimulate additional crude. [See also DER SPIEGEL #6, 1994, pp. 80-1.]

**12/2/93 - SEGODNIA, "Tri kilogramma rtuti v musornom bake."**

A resident of Poslannikovskii St. in Moscow recently discovered a container with approximately three kilograms of mercury in a trash disposal unit. According to the Russian Federation Ministry of Security, such finds are becoming increasingly common. It often occurs that people with access to mercury and other substances take them, hoping to make a profit on the black market. If there are no ready buyers, the culprit hastily disposes of the dangerous materials out of concern for his own health, thereby posing a threat to the public welfare.

**12/2/93 - MOSCOW OSTANKINO TELEVISION BROADCAST**

Three uranium rods (for use in the fuel assemblies of nuclear submarine reactors) were allegedly stolen from a navy base in Murmansk. The case is currently under investigation by the Military Counterintelligence Division of the Ministry of Security.

## **Chronology of Reported Illicit Exports, con't.**

**11/12/93 - THE WASHINGTON POST, "Nuclear Theft Found at Chernobyl," p. A44.**

According to one high-ranking official in charge of security at Ukraine's power plants, such facilities are prone to theft: for example, only one of Ukraine's five nuclear power plants is equipped with isolation doors and electronic passes. Nor is there a registration system restricting access to specific staff members.

**11/11/93 - PRAVDA, "With Uranium on Their Backs: New Incidents of Theft of Strategic Raw Materials," p. 1.**

A number of newly-reported transactions involving strategic raw materials were discussed at a briefing given by the Moscow Internal Affairs Main Administration. In one instance, a Russian citizen allegedly brought Uranium-235 -- wrapped only in aluminum foil -- from Yekaterinburg to Moscow on public transportation. In another case, 300 tons of Magnesium-90 ingots stolen from the storeroom of the Russian Federation State Reserve (worth some 146 million rubles) were detained while en route to a commercial organization in Kaliningrad oblast on tractor-trailers supposedly belonging to Lithuanian companies. [See also JPRS-TND 12/8/93, p. 46]

**11/9/93 - UNCLASSIFIED REPORT FROM THE U.S. DEPARTMENT OF ENERGY ON BELARUSIAN DELEGATION ATTENDING WORKSHOP (SEPT. 13-17, 1993) ON TECHNICAL ASPECTS OF THE INTERNATIONAL NON-PROLIFERATION REGIME.**

According to V.G. Pasko, co-head of the delegation and head of non-tariff regulation for the State Committee for Foreign Economic Relations, the main security issue for Belarus has become the transshipment of sensitive materials through the country. The Institute of Nuclear Problems (INP), he said, is now seeking to develop the equipment needed to make detection possible at the borders. In some cases, programs set up in conjunction with the U.S. Customs Service have already made such detection possible. The director of the INP is now actively striving to obtain U.S. assistance in developing technologies capable of detecting fissile materials, highly-explosive substances and other materials.

**11/8/93 - NUCLEAR FUEL, "Ex-Soviet Nuclear Material Smugglers Lack Professionalism, BKA Chief Says."**

According to the head of the Bundeskriminalamt (BKA), Germany's federal bureau of investigation, "smuggling of nuclear goods into Western Europe from the former Soviet bloc... satisfies five of six criteria that...permit this activity to be considered under the rubric of organized crime." Namely, an illicit activity is considered to constitute organized crime "if it is carried out in a highly professional manner; if there is evidence of corruption; if there is conspiracy; if at least 50% of those involved are foreigners; if threats of violence are made; and if there is an overwhelming profit motive." The one missing link, apparently, is the first of these criteria, professionalism.

"The international, conspiratorial nature of ex-Soviet nuclear smuggling is evident," according to the BKA head. Typically, "a dealer in Poland will bring materials into Germany, from there into Austria, then have a meeting in Switzerland, and hire a fence in Hungary."

**11/5/93 - PRAVDA, "Krazha v Chernobyle."**

Two fuel rods (TVELs) were stolen from the core of the Chernobyl nuclear power plant. The plant's managers have offered ten million karbovantsy (Ukraine's new currency) to anyone who can assist in locating the missing items [See also UNIAR (in Ukrainian), 11/1 and 11/2.]

**11/4/93 - NUCLEONICS WEEK, "NPT Ratification Papers to be Sent to Kazakhstan Parliament This Year."**

An IAEA official who participated in a technical visit made to the Ust-Kamenogorsk plant has stated that large amounts of nuclear materials remain unaccounted for, and that "uranium dioxide pellets were leaking all over the place." Earlier this year British television carried an unconfirmed report to the effect that significant quantities of uranium and beryllium from the facilities at Ust-Kamenogorsk

## Chronology of Reported Illicit Exports, con't.

had been sold to Iran. Vladimir Shkolnik, head of the Kazakhstan Atomic Energy Agency, has commented that the Republic of Kazakhstan "needs equipment and technologies to reduce uncertainties in materials inventories" and establish an effective system of safeguards.

**11/4/93 - FBIS-CENTRAL EURASIA**, "Political Link, Threat from Missing Chernobyl Fuel Denied," from KYIVSKYY VISNYK in Ukrainian 10/28/93.

Summary of interview with Nikolai Sorokin, director of Chernobyl nuclear power plant: The theft of the fuel rods was discovered during routine work in the fuel processing and storage areas; the two rods had been "neatly cut out" of the fuel assembly. According to Mr. Sorokin, the radiation level can become dangerous only when the fuel rod unit (or "cassette," in specialists' jargon) is irradiated in the reactor. Otherwise, individual fuel rods do not emit sufficient radiation to constitute a threat.

**10/30/93 - KIEVSKIE VEDOMOSTI**, "Propazha iadernogo topliva."

According to an official statement made on October 26th by N. Sorokin, director of Chernobyl nuclear power plant, in conjunction with the heads of the State Committee on Atomic Energy Usage, the public should not be overly concerned about the recent disappearance of two fuel rods from the Chernobyl plant: such rods contain only 1.8% Uranium-235 (about 260 g). The remaining portion consists of Uranium-238, which means that each rod has less than 3.5 kg of actual nuclear fuel.

**10/19/93 - SEGODNIA**, "Propal gruzovik, polnyi isotopov."

A truck loaded with containers of environmentally-dangerous radioactive materials was recently stolen from the Tbilisi Geophysical Institute. The whereabouts of the truck are as yet unknown; authorities know only that the parties involved in theft were armed and wearing military uniforms.

**9/14/93 - U.S. DEPARTMENT OF ENERGY MEMORANDUM** on "Reports of Theft and Smuggling of Nuclear Material in the Former Soviet Union."

The events cited include the following:

(1) A gamma radiation unit with Cesium-137 mysteriously disappeared from the production association Khimprom in Ukraine [KIEV HOLOS UKRAINY 7/24/93].

(2) According to the BBC, a group of smugglers who had been stealing nonradioactive stable isotopes from the Elektrokhimpribor facilities in Sverdlovsk-45 have been apprehended [8/6/93].

(3) Some 90 kg of tungsten have been stolen from the Northern Machine-Building Enterprise, the world's largest nuclear submarine plant, according to a report on Moscow Russian Television Network [8/21/93]. 73 kg of the substance were discovered in one worker's apartment, and there is evidence that approximately 20 kg have already been sold to the Baltic States.

(4) The Associated Press reports [8/28/93] that a man has been arrested for trying to sell ten pounds of uranium outside the Kurchatov Institute. The source and destination of the material remain undisclosed, as is the extent to which the uranium was enriched.

(5) Hanoi police arrested a Vietnamese man for bringing about 10 kg of uranium back to Vietnam from the former Soviet Union, where he had been working [JAPAN ECONOMIC NEWSWIRE 8/28/93].

**9/13/93 - NUCLEAR FUEL**, "Smuggling of Soviet Origin Material is Escalating, Crime Agencies Say."

The German Bundeskriminalamt reported 158 cases of nuclear material smuggling in 1992, as compared with 41 in 1991 and 4 in 1990. Chancellor Kohl underscored the priority attention due to such cases by scheduling a high-level meeting on the subject [scheduled for 9/10/93] with officials from various ministries. German authorities apparently believe that nuclear materials are making their way into Europe from the FSU by way of the former Soviet army's air transports. Materials are reportedly flown to the military command center of the Western Force Group (WGT) at Wuensdorf and



## **Chronology of Reported Illicit Exports, con't.**

then shipped by land to Italy, Austria and Switzerland. Furthermore, officials believe that WGT Commander-in-Chief Matvey Bulakov is directly involved in the smuggling, despite the fact that he has flatly denied such allegations.

### **9/2/93 - NUCLEONICS WEEK, "Soviet Isotope Smugglers Arrested in Germany, Finland."**

Two Finns and two Russians were recently arrested in Espoo for smuggling about one gram of radioactive Californium-235 from the FSU, believed to have originated at the Tomsk-7 nuclear complex in Siberia. An Estonian was also arrested in connection with the case. According to the Finnish police, the material was being smuggled from Russia through Estonia to Finland, with Germany being the final destination.

### **8/27/93 - MOSCOW NEWS, "Nuclear Analysis by General Yevstafyev of the Russian Intelligence Service."**

According to General Yevstafyev, an expert in the fields of nuclear non-proliferation and arms control, there are grounds for concern that proliferation of nuclear materials might occur in Russia: the military-industrial complex has lost much of its former clout and prestige, the so-called "closed" cities are undergoing considerable financial difficulties, and secrecy standards are deteriorating. To date, however, no concrete evidence has been produced pointing to actual illegal transactions involving uranium, plutonium and nuclear technologies. In order to prevent the occurrence of such transactions, existing legal means of export control need to be further developed and consistently enforced.

### **8/11/93 - NOVOE RUSSKOE SLOVO, "Khishchenie redkozemel'noe i tsvetnoe."**

According to the Russian Federation Ministry of Foreign Affairs, a member of the Siberian branch of the Academy of Sciences was recently arrested in connection with an attempt to smuggle twelve kilograms of enriched uranium out of Russia. Nine other people were subsequently arrested, five of whom are already facing charges. The leader of the group was Dmitrii Shikhalev, a businessman from Novosibirsk, and the heads of the cooperatives "Amplituda" and "Stella" were also among those arrested. Authorities confiscated 34 kg of silver, 125 kg of zirconium and 12 tons of titanium.

### **8/4/93 - FBIS-CENTRAL EURASIA, "Citizens in Khabarovsk Allege DPRK Loggers Steal Uranium," p. 4, from Vladivostok Radiostantsiya Tikhii Okean in Russian, 8/3/93.**

According to residents of the Khabarovsk Region, loggers from North Korea have been taking uranium from sealed concrete adits in this area and transporting it back to North Korea.

### **8/93 - REPORT ON THE PRELIMINARY RESULTS OF TESTING A SAMPLE RECEIVED FROM THE RUSSIAN SECURITY MINISTRY'S DEPARTMENT FOR COMBATTING CORRUPTION AND ILLEGAL TRAFFICKING.**

An unknown substance was discovered by Western sources and sent to the military lab NPO RADON for spectrometrical tests, which indicated that it was highly radioactive, highly poisonous weapons-grade plutonium.

### **7/27/93 - JPRS-TND, "Police Find Radioactive Material from Ukraine in Saarland" from Hamburg Deutsche Presse Agentur news (7/17/93.)**

The Saarland Criminal Investigation Office has announced that police in Saarbrücken found three plastic bags containing radioactive materials -- believed to be Strontium-90 -- hidden near a railway underpass. The materials appear to have originated in Ukraine, and were traced during the investigation of a 37-year-old businessman from Saarbrücken who has reportedly been selling them in Germany.

### **7/24/93 - HOLOS UKRAYINY, "Who Needs Irradiation?" [See also JPRS-TND 8/2/93]**

According to an anonymous report, a gamma radiation unit containing Cesium-137 has allegedly disappeared from the Sumy production association KHIMPROM. A search for the unit is currently underway, and a reward has been offered to anyone who can provide relevant information.

## Chronology of Reported Illicit Exports, con't.

**7/22/93 - NUCLEONICS WEEK, "'Red Mercury' is Lithium-6, Russian Weaponsmiths Say," p. 10.**

The name "red mercury" is reportedly a code word used in the USSR nuclear weapons program since the 1950s to describe enriched Lithium-6. Lithium-6 has two nuclear weapons uses: as a reactor target for production of tritium, and in the form of Lithium-6 deuteride as a thermonuclear weapon material. The most common production process uses large amounts of mercury as chemical agents. The code name originated because mercuric impurities contaminate the Lithium-6 during production, giving it a red color.

**7/21/93 - NOVAYA YEZHEDNEVNAYA GAZETA, p. 3**

The investigative service of this daily paper claims to have uncovered a sophisticated network of illegal trade in rare earth metals, platinum, beryllium, osmium isotopes, and red mercury. These traders are often said to have good connections with industry officials. The journalists describe a number of instances in which, by posing as potential buyers, they were able to obtain information about the illegal market for nuclear materials. In one such instance, for example, a worker from an uranium enrichment plant showed the journalists a ten kilogram sample of Uranium-238 pellets, claiming that more could easily be obtained. In another case, weapons-grade plutonium from Ryazan was brought to Moscow in a Ukrainian gasoline truck.

**7/16/93 - IZVESTIYA, "Plutoniévaya 'bomba' iz Rossii v Londone ne vzorvalas'," p. 6.**

Reports that British journalist Roger Cook intended to fashion a small bomb from a consignment of twenty-five kilograms of supposedly weapon-grade plutonium which he said he obtained on the Russian black market generated no particular interest on the part of nuclear experts. This article points out that Cook's story was not well documented, in as much as very little information was given about how and where the plutonium was obtained. Additionally, it seems Cook reported that all twenty-five kilograms of the Plutonium-239 were placed in a single container, whereas only six kilograms of such material constitutes critical mass. The name of the dealer, who lived somewhere on the outskirts of Moscow, was said to be "Gennadi."

**7/14/93 - REUTERS, "Russian Dealers Selling Plutonium - Finnish Paper."**

The Finnish newspaper IltaHeti wrote that Russian dealers recently offered its reporters bomb-grade plutonium, a sample of which was proven to be genuine by a laboratory test. The reporters said they contacted the dealers together with British and German television reporters. One of the dealers, "Gennadi," stated that he could deliver 15-16 kilograms of Plutonium-239 in 10 days. He also offered two missiles with built-in warheads. The agreed price for the plutonium was \$15 million per kilogram. Gennadi said that an advance of \$100,000 was needed to pay scientists in restricted towns where strategic weapons dismantlement was taking place.

**7/13/93 - COMPUSERVE-EXECUTIVE NEWS SERVICE from UPI, 7/13/93.**

Arzamas-16 director Vladimir Belugin claimed that "Saddam Hussein's people" had offered the center \$2 billion for a nuclear warhead.

**7/12/93 - JPRS-TND, "Officials Seize Radioactive Material," p. 28, from Vienna KURIER in German, 7/6/93.**

Austrian Interior Ministry Officials apprehended three would-be nuclear smugglers near a supermarket in Schwechat. They had in their possession 1.5 kg of radioactive material.

**7/9/93 - REUTERS, "Estonia Arrests Swedes Who Had Radioactive Material."**

Estonian police arrested two Swedish men for allegedly smuggling a 28 kilogram lead container of Cesium-137 onto a ferry from Estonia to Sweden.

**7/6/93 - VIENNA KURIER, "Officials Seize Radioactive Material," [See also JPS-TND 7/12/94, p. 28]**

Austrian Interior Ministry Officials apprehended three would-be nuclear smugglers near a supermarket in Schwechat. They had in their possession 1.5 kg of radioactive material.

## **Chronology of Reported Illicit Exports, con't.**

**7/1/93 - PRAVDA**, "Red Mercury Seen as a 'Fiction Used in Money Laundering Scam.'" [See also **JPRS-PROLIFERATION ISSUES**, 7/12/93 p. 23]

Major General Aleksandr Gurov, director of the Security Ministry's Scientific Research Institute of Security, said that "red mercury" is a slang term for "oxide of mercury."

**7/1/93 - FBIS-CENTRAL EURASIA**, "Specialists Arrested for Selling Isotopes Abroad," p. 42 from **PRAVDA**, 6/30/93, p. 1.

Twelve specialists "who took part in" the production of rare earth elements such as thallium, palladium, rubidium, and others were arrested for the illegal sale of the materials. The group, some members of which have "academic titles," originated in Sverdlovsk-45. The Stabiks isotope stabilization center is implicated in the affair.

**6/30/93 - PRAVDA**, "Specialists Arrested for Selling Isotopes Abroad," p. 1. [See also **FBIS-CENTRAL EURASIA** 7/1/93, p. 42]

Twelve specialists "who took part in" the production of rare earth elements such as thallium, palladium, rubidium and others were arrested for the illegal sale of the materials. The group, some members of which have "academic titles," originated in Sverdlovsk-45. The Stabiks isotope stabilization center is implicated in the affair.

**6/25/93 - ROSSISKAYA GAZETA**, "Glazyev on Corruption, Need for Export Controls," p. 3. [See also **FBIS-CENTRAL EURASIA** 6/29/93, p. 42-3]

Glazyev, the Russian minister of foreign economic relations, reports that in 1992, over 6,000 crimes were uncovered which involved the illegal export of strategic raw materials.

**6/24/93 - MOSCOW NEWS #23**, "Looking for a Bomb, Finding Radiation."

The Baltic Independent has reported that in answering a false bomb threat called into the Lithuanian Shareholders' Innovation Bank in Vilnius, the local police discovered some twenty sealed containers emitting radiation. They contained irradiated beryllium, which is allegedly worth more than \$10 million and has applications in both nuclear power engineering and nuclear missiles.

**6/23/93 - KIEVSKIE VEDOMOSTI**, "Ukraina -- mezhdv dvumia ogoniami."

Customs officials in the Ukrainian port of Ilichevsk detained a shipment of a major rocket fuel component that was being sent from Russia. Four twenty-ton containers of ammonium perchlorate, the property of the joint stock trading company "Pavox," left Novorossiisk bound for Varna in Bulgaria. It was the American Embassy in Ukraine that alerted customs authorities that the cargo was ultimately destined to fall into the hands of Libyan scientists working to develop their country's missile program.

**6/14/93 - PROLIFERATION ISSUES**, "Radioactive Substance Discovered; Ukraine Named as Source," pp. 8-9 from **STANICE PRAHA RADIO NETWORK**, 6/9/93, Alexander Picha.

West Slovak police have found a container of an unidentified radioactive material. The Slovak Interior Ministry values the substance at 100 million korunas. The Slovak police said the material was of Ukrainian origin.

**6/14/93 - PROLIFERATION ISSUES**, "Chechenis Said to Traffic Uranium Via North Cyprus," p. 26, from **I SIMERINI**, 6/7/93, p. 18, Khristo Andoniadhou.

This Greek newspaper reports that Checheni nationals in the Russian mafia are trafficking uranium stolen from the Russian army with the protection of the President of North Cyprus, Rauf Denktaş. The Checheni officials have been linked to arms and uranium dealers Asil Nadir and Adnan Kashoggi. The uranium is reportedly transported through Istanbul to European and Eastern countries.

**6/7-13/93 - KOMMERSANT**, "Zvezdnyi Put'," p. 28.

It was reported in June 1993 that "not long ago" Russian police stopped a group of ten smugglers trafficking in rare-earth elements and strategic materials. The group was arrested after attempting to

## Chronology of Reported Illicit Exports, con't.

take 12 kg of enriched uranium out of the country. The gang had been led by Dmitri Shikhalev, a Novosibirsk businessman. Other members included a worker at the Siberian branch of the Russian Academy of Sciences and two owners of cooperative businesses. The group reportedly was found in possession of 34 kg of silver, 125 kg of zirconium and 12 tons of titanium. The materials are believed to have been stolen in 1992 from one of the defense industry complexes in Novosibirsk.

### 6/93 - ARGUMENTY I FAKTY #26, p. 4.

Russian Federation Vice-President Aleksandr Rutskoi has accused the Russian firm Promekologiya of illegally exporting "red mercury." The firm's president, Oleg Sadykov, insists that Promekologiya has filed all the correct documents and notified all necessary officials. He says that it is only because of other, illegal exporters that the government has rescinded its approval of Promekologiya's exports.

### 5/28/93 - KOMSOMOL'SKAYA PRAVDA, p.1.

Ten radioactive isotopes and their "technical passports" were stolen from the Nikitovskii mercury production facility. Six men were arrested in connection with the incident.

### 5/26/93 - FBIS-CENTRAL EURASIA, "Nuclear Materials Reportedly Smuggled to Middle East," p. 47 from MOSKOVSKIYE NOVOSTI, 5/23/93, p. A5.

Investigations into the theft of uranium from an Udmurtia plant have uncovered an "entire international syndicate comprising Russia, Belarus, the Baltic states and Poland" which transports Uranium-238 to Western Europe. The plant has been identified as the Chepetsk Mechanical Plant.

### 5/22/93 - THE ECONOMIST, "Fools' Mercury," p. 70.

Oleg Sadykov, president of the Yekaterinburg company Promekologiya, said that he has a contract to sell 84 tons of "red mercury" over the next three years to an American company called API International. The deal is worth \$24.2 billion. Russian President Boris Yeltsin signed a "secret decree" in February of 1993 granting Promekologiya the right to export the material, but permission was revoked on March 20, 1993.

### 5/21/93 - PROLIFERATION WATCH vol. 4, no. 3.

The Main Military Prosecutor's Office of the Russian Federation has instigated criminal proceedings against former Russian Deputy Prime Minister Georgii Khiza on the grounds that he was engaged in smuggling surface-to-surface and air-to-air missiles to South Africa.

### 5/12/93 - IZVESTIYA, "Ukraina postavila Irany vosem' krylatykh raket," p.3.

According to data collected by British and American intelligence reported in the Egyptian newspaper AL-AKBAR, Ukraine supplied Iran with eight cruise missiles.

### 5/6/93 - RUSSIA & CIS TODAY (In Russian), p. 6 from TELEMIKST Television program, "Promekologiya predyavlyayet isk Aleksandru Rutskomu."

Krivinyuk, chief engineer of the Promekologiya concern accused by Pravda of illegally exporting 'red mercury' in collusion with Yeltsin's administration, confirmed the existence of the material, but stressed that Promekologiya has not exported a gram of the material. The proceeds from 'red mercury' exports were to be spent on various environmental projects. The Pravda publication will cost Russia several billion dollars in damages.

### 5/4/93 - JPRS-TND-93-012, "25 Kilos of Cesium-137 Isotope Discovered," p. 9 from PAP, 4/30/93.

Gdansk police found twenty-five kilograms of Cesium-137 in a ceramic container bearing cyrillic lettering buried in Poland five kilometers from the Russian border.

### 4/18/93 - MOSCOW NEWS (in Russian), "Radioaktivnaya trgovlya," p. 15A.

Polish security operatives arrested three traders in radioactive materials. The agents seized three

## **Chronology of Reported Illicit Exports, con't.**

kilograms of uranium at the car belonging to one of the suspects. The uranium is thought to have originated in the FSU.

**4/16/93 - PROLIFERATION ISSUES, "Prominent Businessman Accused of Uranium Trafficking," p. 22 from CTK, 3/30/93.**

Slovak police arrested three people for possession of approximately three kilograms of Uranium-235 and Uranium-238 that was of Russian origin.

**4/16/93 - PROLIFERATION ISSUES, "Cesium-137 Isotope Stolen Again in Estonia," p. 53 from BALTFAX, 3/29/93.**

In a heist identical to one in the fall of 1992, a piece of equipment containing Cesium-137 has been stolen from the Slantsekhim corporation in Kokhtla-Jarve, Estonia.

**4/16/93 - PROLIFERATION ISSUES, "Police Detain Thieves," p. 53 from BALTFAX, 4/6/93.**

Estonian security police detained two men for possession of 2.8 grams of cesium extracted from a piece of equipment stolen from the Slantsekhim plant in Kokhtla-Jarve. They had intended to sell the material for \$9,000 per gram.

**4/15/93 - NUCLEONICS WEEK, "Radioactive Materials Smuggling Defies Customs' Attempt to Halt It," p. 15.**

Swedish customs officials have warned businesses dealing in scrap metal to be on the alert for offers from the former Soviet Union. In 1992, for example, a Swiss firm offered one Swedish businessman 500 grams of Cesium-137 for US \$60,000 per gram; it is believed that the cesium originated in the former Soviet Union.

It is anticipated that Ukraine, in particular, will experience an increasing number of thefts of nuclear materials: Russia remains unwilling to accept fuel from Ukraine, whose stockpiles therefore continue to grow. (To date Ukraine has no reprocessing or disposal facilities.)

**4/15/93 - IZVESTIYA, "Komu prednaznachen iadernyi gruz - poka taina," p. 1.**

Ukrainian customs agents seized 80 tons of an undisclosed type of nuclear fuel in the port of Ilyichevsk. They found no export licenses for the cargo, only railway transport documents. According to Reuter agency's version, this cargo--a chemical used for producing rocket fuel--was bound for Libya.

**4/13/93 - DAILY TELEGRAPH, "Safety Fear in Lithuania as Uranium Disappears."**

More than 600 pounds of uranium and strontium have disappeared recently from the Ignalina nuclear power plant in Lithuania. Police are also looking for 221 pounds of Uranium-238 stolen from the industrial town of Panevezys, Lithuania. They have arrested Raimondas Urbonas, who admitted to smuggling 221 pounds of uranium from Russia to Lithuania to be sold in Poland. Urbonas said that, afraid of being caught, he dumped the material into a river. Prosecutors believe that he is lying, and that the material has already been sold. [See below, 1/13/93, REUTER.]

**4/9/93 - REUTER, "Illegal Uranium Dealers Held in Poland."**

In Rzeszow, a southern province of Poland, three people were arrested on 4/8 for trying to sell 3 kg of uranium of foreign origin. According to the Polish Deputy Interior Minister Jerzy Zimopwski, there were one hundred attempts to smuggle radioactive material through Poland in 1992, as compared with only thirty in 1991.

**4/6/93 - KOMSOMOLSKAYA PRAVDA, "Kurit - vredno," p. 1.**

Employees of the Orel branch of the Moscow Instrumentation Research & Development Institute tried to sell 75 grams of plutonium smuggled from their Institute for \$100,000. The local police filed a criminal suit against them.

## Chronology of Reported Illicit Exports, con't.

### **4/1/93 - LONDON TIMES, "Slovakia Uranium Suspects Go Free."**

Two men arrested on charges of illegally handling weapons-grade radioactive material, which the Czech news agency CTK said was of Russian origin, were released after prosecutors failed to make a case against them within the 24-hour period stipulated by Slovak law.

### **4/93 - NUCLEAR NEWS**

Managers at the Ignalina plant in Lithuania have dismissed speculations by the press that some 200 kg of "missing" low-enriched uranium has been stolen. The LEU consisted of fuel assemblies for the plant's RBMK reactors. At a press conference, the managers said they expected the uranium to be found, or that an accounting error was responsible for the "loss."

### **3/31/93 - JPRS-TEN, "Cesium Containers Detained in Taganrog," from Moscow Russian Television Network 3/22/91.**

It is believed that a small company in Taganrog intended to sell two containers of radioactive Cesium-137 for approximately \$80,000.

### **3/22/93 - PROLIFERATION ISSUES, "Dealers Arrested," p. 18**

Three residents of the Gdansk area (Poland) were arrested on 3/5 for attempting to sell half a kilogram of radioactive uranium oxide. Six kilograms of U-238 were also confiscated at the time of the arrest.

### **3/19/93 - MOSCOW NEWS, p. 9.**

Citing sources at Kazakhstan's "nuclear center," the BBC reported that an Iranian delegation had visited the republic in an attempt to purchase components for "nuclear units."

### **3/19/93 - KOMSOMOLSKAYA PRAVDA, "Ne vse khorosho, chto plokho lezhit," p. 4.**

Three containers with Cesium-137 weighing a total of 16 kg were stolen from the Petrovsky Plant in Dnepropetrovsk.

### **3/10/93 - SEGODNYA, "Krast' uran ne nuzhno, on togo ne stoit," p.7.**

A seven-meter-long fuel assembly with low-enriched Uranium-238 weighing over 280 kg was stolen from the Ignalina nuclear power plant in Lithuania. It is estimated that the assembly also contains roughly 2 kg of strontium and 3-5 kg of plutonium. These radionuclides, however, are very hard to extract. Experts at the Russian Ministry of Nuclear Power and Industry believe that the assembly was stolen by an employee of the Ignalina plant, who wanted to resell uranium. The employee acted in collusion with the security guards, since the assembly emits high levels of radioactivity and could not have passed the exit dosimeters unnoticed. Aleksandr Mokhov, the head of the Russian Nuclear Power and Industry Ministry Main Department for the Protection of Information, Nuclear Materials and Facilities, says that three similar cases, which have taken place in Podolsk, Glazov and Arzamas-16, are on record at his department.

### **January/February 1993 - ARMS CONTROL TODAY, "Nuclear Exports from the Former Soviet Union," William C. Potter, p. 3.**

Ukraine is reported to have shipped 45 tons of hafnium and zirconium to Belgium and the Netherlands and eleven tons of hafnium to Hungary in 1992.

### **2/23/93 - AGENCE FRANCE PRESSE, "Radioactive Container Stolen in Belarus."**

A 40 kg container of Cesium-137 was stolen from a company in the Minsk region of Belarus.

### **2/21/93 - AGENCE FRANCE PRESSE, "Russian Police Intercept Ukraine-bound Plutonium."**

Russian authorities in the city of Belgorod intercepted an apparently unlicensed shipment of eleven lead containers of plutonium.

## **Chronology of Reported Illicit Exports, con't.**

**2/12/93 - PROLIFERATION ISSUES, "State Protection Office 'Aware' of Uranium Purchase Offer," p. 6.**

The head of the Polish State Protection Office, Jerzy Konieczny, said in a recent television interview that several cases of radioactive materials being smuggled from the former Soviet Union to Poland had gone to court. On 1/19, for example, former Deputy Minister of Culture Kazimierz Clapka

and Waldemar M., a former security officer, were arrested in Warsaw after attempting to sell uranium to German reporters posing as businessmen. A third party, who is reportedly associated with the former East German Stasi, was also arrested for having arranged the meeting between the seller and buyers.

**1/21/93 - REUTER, "German Police Catch Nuclear Smugglers."**

Four men from the former Czechoslovakia were arrested in Germany in possession of 6.5 micrograms of NIS-origin Californium-252.

**1/21/93 - GAZETA INTERNATIONAL, "Former Officials Trading in Radioactive Materials."**

Two former Polish government officials have been charged with illegal trade in radioactive materials used in the production of nuclear weapons after they offered to sell uranium, plutonium, warheads and torpedoes to undercover authorities. They were found to be in possession of diaries and notebooks listing names and telephone numbers of people from various former Soviet republics, "most probably functionaries of former special services."

**1/13/93 - REUTER, "Police Search Lithuanian River for Missing Uranium."**

A Lithuanian businessman who had bought two uranium rods in hopes of selling the material abroad dumped his cache into the Nevezis river in Lithuania after becoming frightened upon learning the original thieves had been arrested. The uranium had been stolen from a plant in the autonomous republic of Udmurtia.

**1/7/93 - JPRS-PROLIFERATION ISSUES, "Planned Sales in Poland Thwarted," p. 25 from AFP, 12/23/92.**

Prosecutors in Udmurtia, Russia, announced that a group of thirteen people have been arrested for stealing uranium from a plant in Glazov, Udmurtia and smuggling it into Poland. The main part of the material was allegedly sold for some \$700,000/kg in the West, its ultimate destination apparently being countries of the Middle East. Another portion of the uranium turned up in Grozny (in Russia), where it was eventually purchased by Azeris for resale to Iran for a price on the order of \$15 million.

**1/6/93 - CURRENT DIGEST OF THE SOVIET PRESS VOL. XLIV, NO. 49 (1992), "Sellers of Cesium and Plutonium From Former USSR Arrested in FRG."**

German and Austrian police uncovered and arrested sixteen people who sought to sell radioactive materials from Ukraine in Germany and other Western countries. The amount of radioactive materials involved has not been specified, but the smugglers appear to have asked for over 100 million marks. This incident is but the latest in a series of such attempted transactions in Germany: 1.2 kg of radioactive materials were seized there during the first half of this year, and authorities expect this figure to be even greater for the second half of the year.

**1/93 - NUCLEAR ENGINEERING TODAY, "Bomb Plot... or Not?"**

In December of 1991, 140 plutonium disks containing some 100 kg of Pu-239 were stolen from the Bulgarian firm Electrocommerce, possibly for sale to Iraq, according to The Sunday Express (United Kingdom). Bulgarian officials dismissed the story as absurd, saying that the quantity of plutonium involved was less than that which is required to manufacture even one weapon.

## **APPENDIX**

### **Maps of Belarus, Kazakhstan, and Ukraine:**

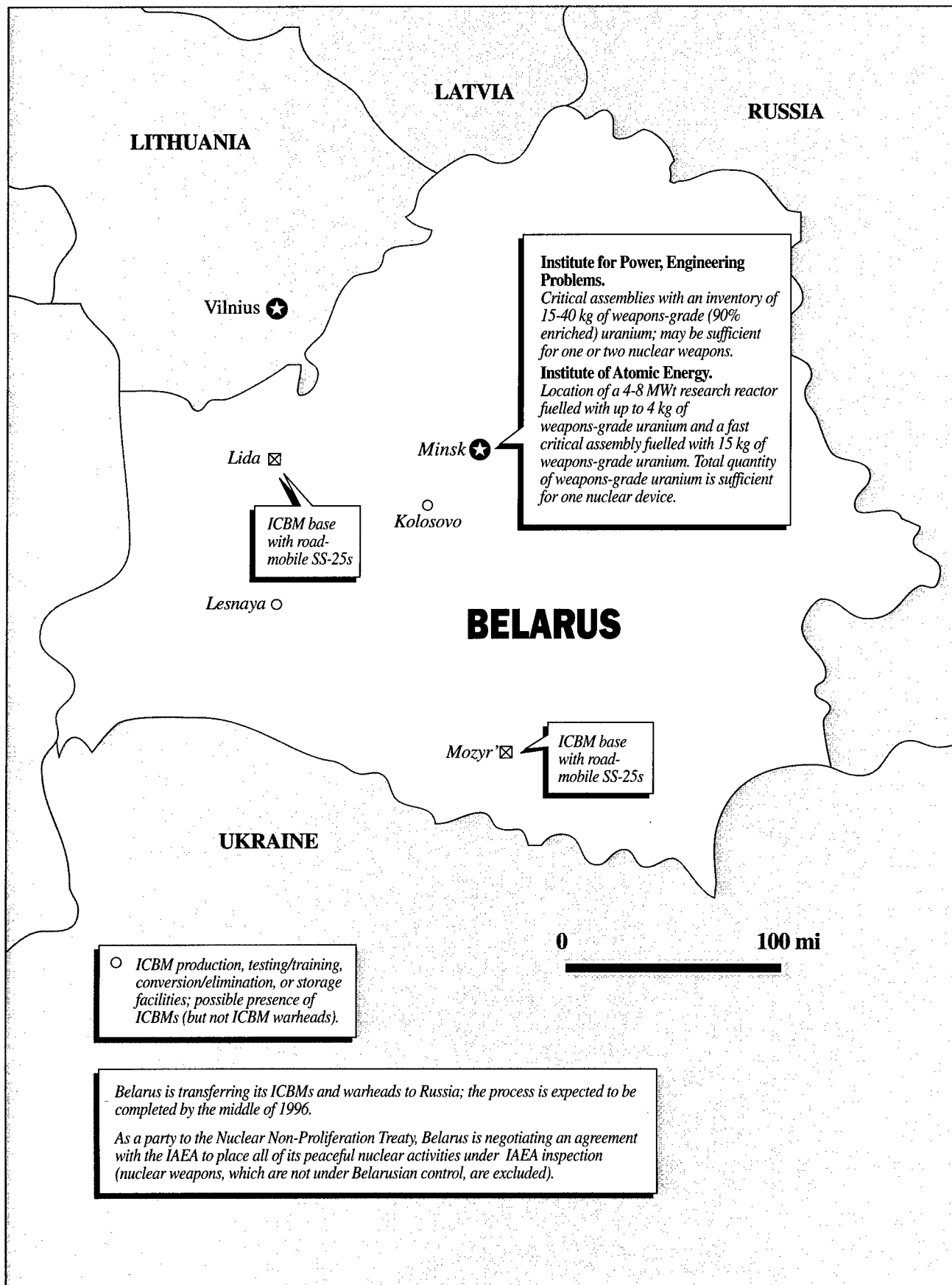
#### ***Nuclear Weapons Sites and Other Sites of Proliferation Concern***

### **Map of Russia:**

#### ***Russia's Nuclear Weapons Infrastructure***



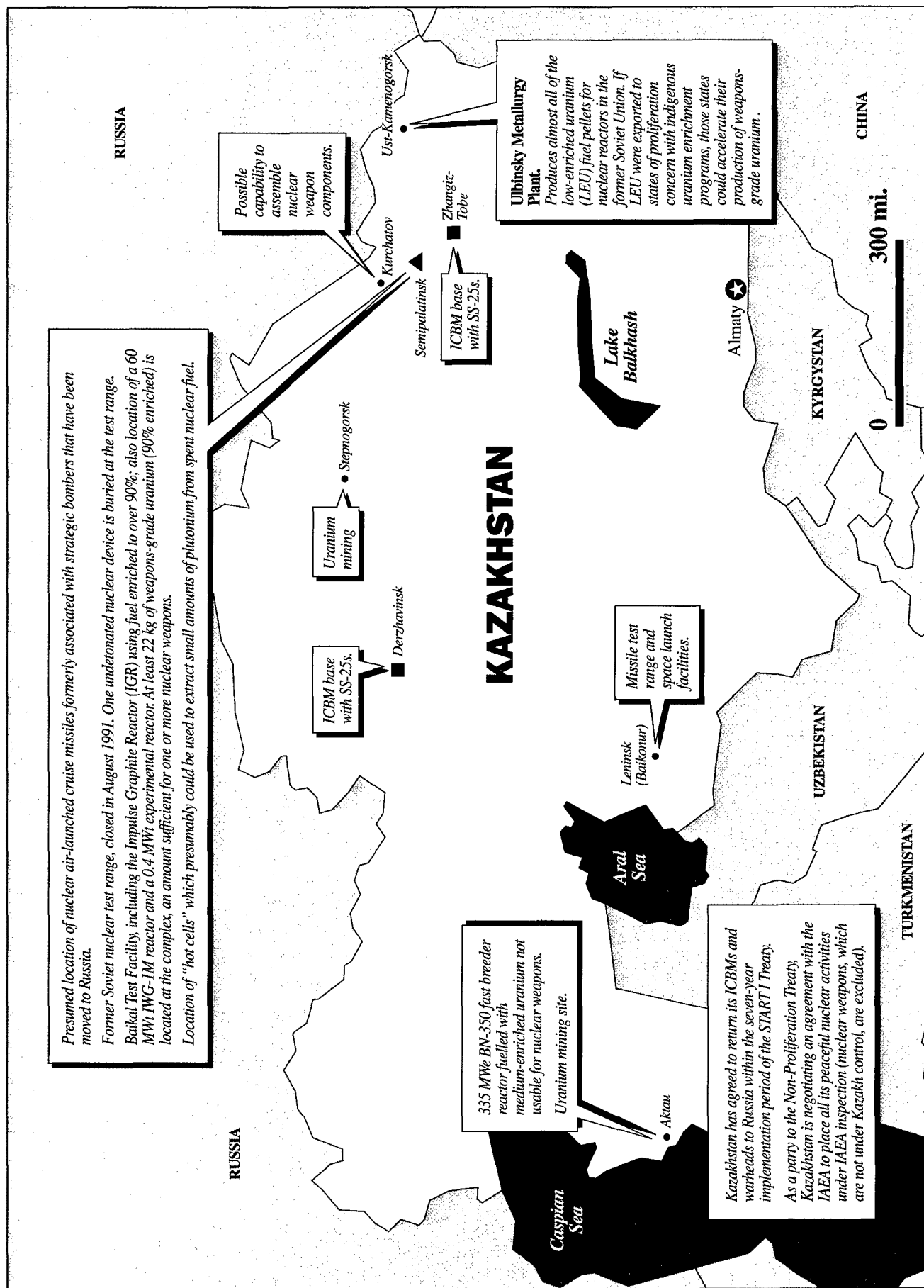
## BELARUS: Nuclear Weapons and Other Sites of Proliferation Concern



Carnegie Endowment for International Peace

SOURCES: William Potter, *Nuclear Profiles of the Soviet Successor States*, 1993 and START Treaty Memorandum of Understanding, 1990.

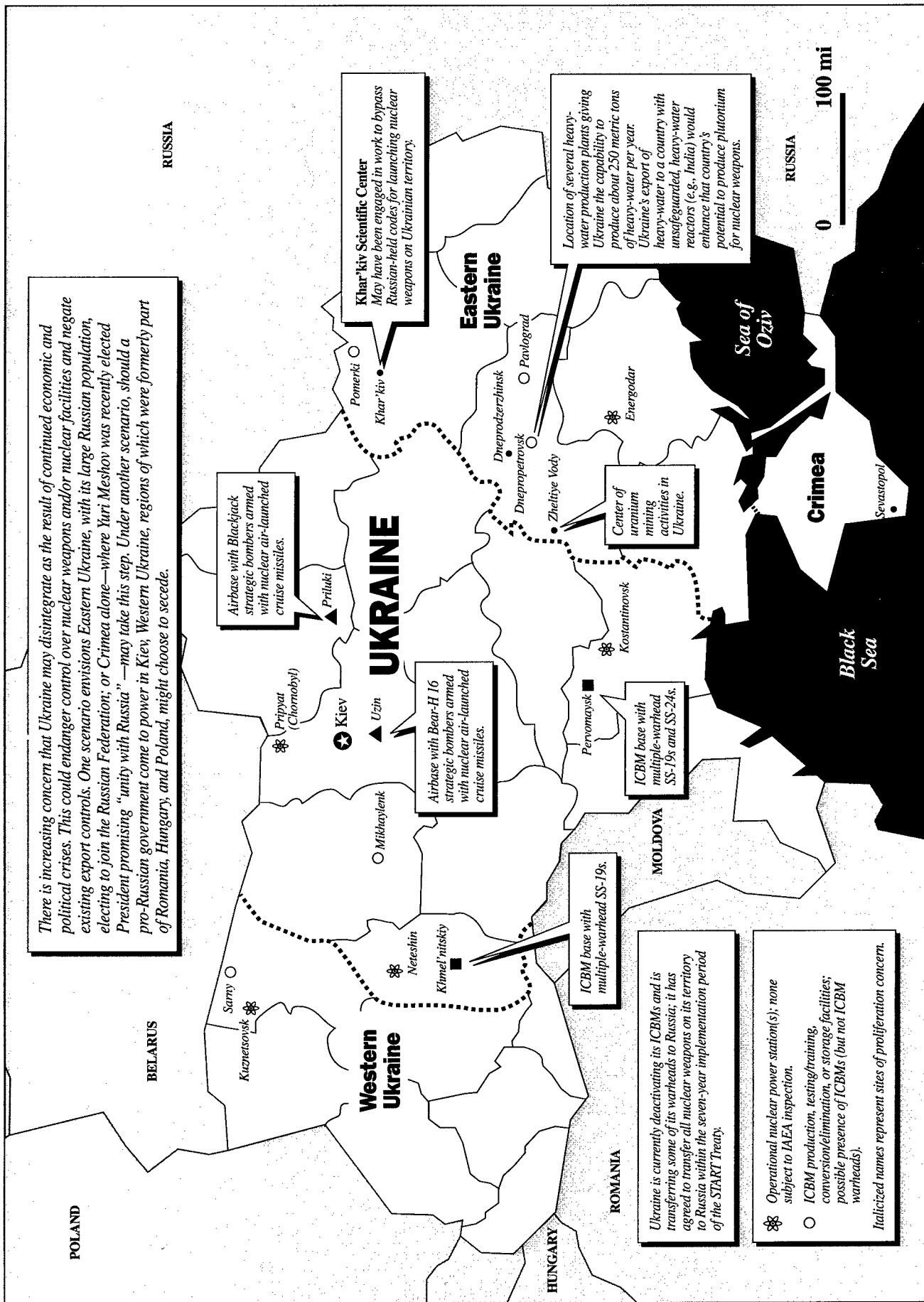
# KAZAKHSTAN: Nuclear Weapons and Other Sites of Proliferation Concern



Carnegie Endowment for International Peace

SOURCE: William Potter, *Nuclear Profiles of the Soviet Successor States*, 1993

# UKRAINE: Nuclear Weapons and Other Sites of Proliferation Concern



# Russia's Nuclear Weapons Infrastructure

## Operational Strategic Nuclear Weapons Facilities

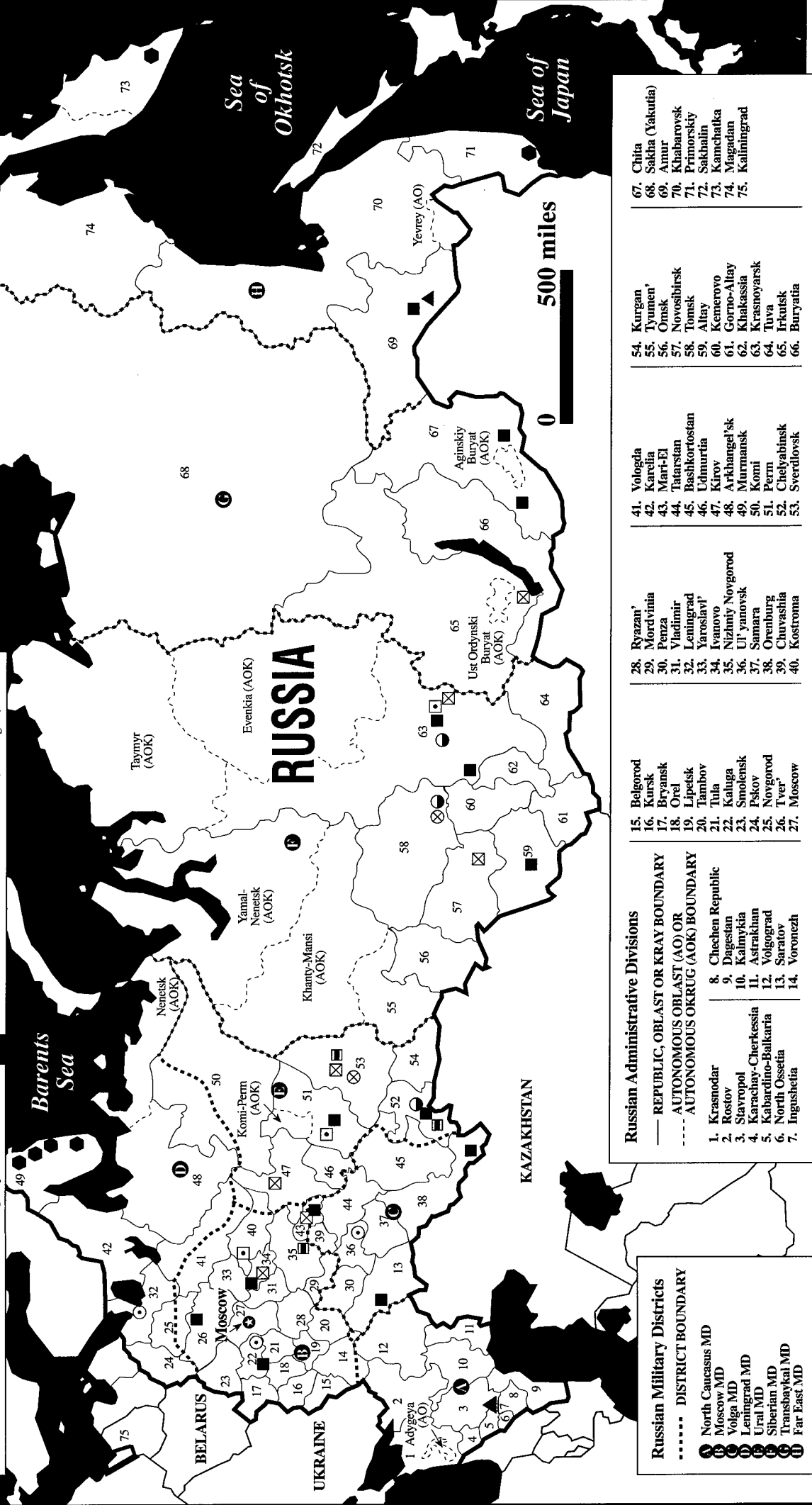
- Silo-based Inter-Continental Ballistic Missiles (ICBMs)
- ⊠ Road-mobile ICBMs
- Rail-mobile ICBMs
- ⊙ Anti-Ballistic Missiles (ABMs)
- ⊛ Submarine Launched Ballistic Missiles (SLBMs)
- Heavy Bombers carrying Air-Launched Cruise Missiles (ALCMs) or Gravity Bombs

SOURCE: START Memorandum of Understanding, September 1990

## Locations with Weapons-Usable Fissile Material for One or More Nuclear Bombs

- Plutonium Production
- ⊗ Uranium Enrichment/Processing
- ⊠ Warhead Assembly/Dismantlement
- ⊙ Research Institute/Research Reactor

SOURCE: Monterey Institute of International Studies, Monterey, CA;  
Natural Resources Defense Council, Washington, DC



## Russian Administrative Divisions

- REPUBLIC, OBLAST OR KRAY BOUNDARY
- AUTONOMOUS OBLAST (AO) OR AUTONOMOUS OKRUG (AOK) BOUNDARY
- 1. Krasnodar
- 2. Rostov
- 3. Stavropol
- 4. Kabardino-Cherkessia
- 5. North Ossetia
- 6. Ingushetia
- 7. Chechen Republic
- 8. Dagestan
- 9. Kalmykia
- 10. Astrakhan
- 11. Volgograd
- 12. Saratov
- 13. Voronezh

## Russian Military Districts

- ..... DISTRICT BOUNDARY
- Ⓐ North Caucasus MD
- Ⓑ Moscow MD
- Ⓒ Volga MD
- Ⓓ Leningrad MD
- Ⓔ Ural MD
- Ⓕ Siberian MD
- Ⓖ Transbaykal MD
- Ⓗ Far East MD

- 15. Belgorod
- 16. Kursk
- 17. Bryansk
- 18. Orel
- 19. Lipetsk
- 20. Tambov
- 21. Tula
- 22. Kaluga
- 23. Smolensk
- 24. Pskov
- 25. Novgorod
- 26. Tver
- 27. Moscow

- 28. Ryazan'
- 29. Mordvinia
- 30. Penza
- 31. Vladimir
- 32. Leningrad
- 33. Yaroslavl'
- 34. Ivanovo
- 35. Nizhniy Novgorod
- 36. Ul'yanovsk
- 37. Samara
- 38. Orenburg
- 39. Chuvashia
- 40. Kostroma

- 41. Volgoda
- 42. Karelia
- 43. Mari-El
- 44. Tatarstan
- 45. Bashkortostan
- 46. Udmurtia
- 47. Kirov
- 48. Arkhangel'sk
- 49. Murmansk
- 50. Komi
- 51. Perm
- 52. Chelyabinsk
- 53. Sverdlovsk

- 54. Kurgan
- 55. Tyumen'
- 56. Omsk
- 57. Novosibirsk
- 58. Tomsk
- 59. Altay
- 60. Kemerovo
- 61. Gorno-Altay
- 62. Khakassia
- 63. Krasnoyarsk
- 64. Tuva
- 65. Irkutsk
- 66. Buryatia

- 67. Chita
- 68. Sakha (Yakutia)
- 69. Amur
- 70. Khabarovsk
- 71. Primorsky
- 72. Sakhalin
- 73. Kamchatka
- 74. Magadan
- 75. Kaliningrad



**THE CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE**

**2400 N STREET, NW WASHINGTON, DC 20037**

**TELEPHONE: 202-862-7954 FACSIMILE: 202-862-2610**

**E-MAIL INTERNET: 71263.107 @COMPUSERVE.COM**



**MONTEREY INSTITUTE OF INTERNATIONAL STUDIES**

**425 VAN BUREN STREET MONTEREY, CA 93940**

**TELEPHONE: 408-647-4154 FACSIMILE: 408-647-3519**

**E-MAIL MIISCRES @PANDORA. SF.CA.US**